FINDING OF NO SIGNIFICANT IMPACT

FOR

Amphibious Ready Group/Marine Expeditionary Unit Readiness Training
Eglin AFB, Florida

Pursuant to the Council on Environmental Quality Regulations for implementing the National Environmental Policy Act (NEPA) promulgated at 40 Code of Federal Regulations Part 1500 (40 CFR §§1500-1508), and Air Force Instruction (AFI) 32-7061, *Environmental Impact Analysis Process*, as promulgated at 32 CFR Part 989, the Department of the Air Force has prepared an Environmental Assessment (EA) (by adopting the Navy/USMC EA as described in the next paragraph) of the potential environmental impacts associated with the proposed decision of the Air Force to allow the U.S. Marine Corps and the U.S. Navy to conduct Amphibious Ready Group/Marine Expeditionary Unit (ARG/MEU) Readiness Training at Eglin AFB, FL.

In situations where non-Air Force entities (such as the Marines and Navy) request such an action by the Air Force, Air Force decisions on such proposals must take into consideration the potential environmental impacts of the applicant's proposed activity (as described in an Air Force environmental document), insofar as the proposed action involves Air Force property or programs or requires Air Force approval. The Air Force may require the requester to prepare an EA (as was done here with the Marines/Navy), but the Air Force must independently evaluate and approve the scope and content of the EA. The Air Force has independently evaluated and approved the scope and content of the EA "Amphibious Ready Group/Marine Expeditionary Unit Readiness Training" (April 2003) prepared by the U.S. Marines and U.S. Navy and hereby adopts the EA as an Air Force environmental document insofar as the proposed action involves Air Force property or programs or requires Air Force approval.

This Finding of No Significant Impact (FONSI) as required by 40 CFR §1501.4(e) and AFI 32-7061 as promulgated at 32 CFR §989.15 attaches and incorporates by reference the Finding of No Practicable Alternative (FONPA) as required by Executive Order (EO) 11988, *Floodplains Management*, and EO 11990, *Protection of Wetlands*. The FONPA was made by the Vice Commander, Air Force Materiel Command.

DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

Proposed Action

The Air Force proposes to allow the U.S. Marines and U.S. Navy to conduct ARG/MEU readiness training at Eglin AFB and Hurlburt Field. The training of Marines and Sailors is anticipated to occur twice per year with each training event having a total duration of 10 days, or less if only a portion of the activities is conducted. It is possible that the training could only occur once during some years and possibly not at all in others. The following table lists the types of training activities that would occur under the Proposed Action, including locations. Detailed descriptions of each activity can be found in Chapter 2 of the EA.

Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE **11 APR 2003**	2. REPORT TYPE	3. DATES COVERED **00-00-2003 to 00-00-2003**
4. TITLE AND SUBTITLE **Amphibious Ready Group/Marine Expeditionary Unit Readiness Training Final Environmental Assessment**		5a. CONTRACT NUMBER 5b. GRANT NUMBER 5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)		5d. PROJECT NUMBER 5e. TASK NUMBER 5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **Science Applications International Corporation (SAIC),1140 North Eglin Parkway,Shalimar,FL,32579**		8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)		10. SPONSOR/MONITOR'S ACRONYM(S) 11. SPONSOR/MONITOR'S REPORT NUMBER(S)
12. DISTRIBUTION/AVAILABILITY STATEMENT **Approved for public release; distribution unlimited**		
13. SUPPLEMENTARY NOTES		

14. ABSTRACT					
This Environmental Assessment (EA) has been prepared by the United States Marine Corps and the Department of the Navy (DON) in accordance with the National Environmental Policy Act of 1969 (NEPA), 42 United States Code (USC) ?? 4321-4370d, as implemented by the Council on Environmental Quality (CEQ) regulations, 40 Code of Federal Regulations (CFR) Parts 1500-1508, the guidelines contained in the Chief of Naval Operations Environmental and Natural Resources Program Manual Instruction (OPNAVINST) 5090.1B dated 9 September 1999, and Marine Corps Order (MCO) 5090.2A, Chapter 12, dated 10 July 1998, Environmental Compliance and Protection Manual, which establish procedures for implementing NEPA. The Proposed Action involves the conduct of Amphibious Ready Group/Marine Expeditionary Unit training at Eglin Air Force Base (AFB) water and land test and training ranges. The training would occur no more than twice yearly and would not exceed a 10-day duration for a given ARG/MEU training event. Access of amphibious craft into the Eglin Military Complex would be accomplished through military owned land-water interfaces. Fixed-wing and rotary aircraft would engage in live fire operations on test areas currently designated for that purpose. Ship operations would involve launch and retrieval of aircraft and amphibious vessels and would occur within a 5 by 20 nautical mile area approximately 1 to 6 nautical miles offshore. Tracked and wheeled vehicles would conduct maneuvering and live fire in approved areas. Potential amphibious access points into the Eglin reservation include Santa Rosa Island, Wynnhaven Beach White Point, Hurlburt Field Gravel Offloading Site, Hammock Point (Test Area D-84), East Bay Point, Yellow River, and Alaqua Point. Some site modifications (e.g., boat landing ramps and staging areas) and infrastructure improvements (e.g., roads, bridges, and culverts) would be required at several locations. This EA evaluates potential impacts to the following resources: Transportation, Socioeconomics, Noise, Safety, Wetlands Floodplains, Water Quality, Air Quality, Soils/Erosion, HAZMAT/Solid Waste, Sensitive Species, Sensitive Habitats, and Cultural Resources. In addition to the Proposed Action, an Action Alternative and a No-Action Alternative were evaluated. The Action Alternative, or Alternative 1, is to conduct ARG/MEU training at Eglin AFB and Hurlburt Field with only minimal site and infrastructure improvements.					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT **unclassified**	b. ABSTRACT **unclassified**	c. THIS PAGE **unclassified**	**Same as Report (SAR)**	**686**	

MEU Training Activity	Locations
Insertion of Forward Command Element	Gulf of Mexico Santa Rosa Island Santa Rosa Sound Wynnhaven Beach Hammock Point (TA D-84) Alaqua Point White Point East Bay Choctawhatchee Bay Yellow River Eglin Airspace Eglin Interstitial Areas Eglin Test Areas Hurlburt Field
Insertion of Reconnaissance and Surveillance (R&S) Teams	
Ship Operations	
MEU Aviation Operations	
Helicopter Raids	
Rapid Ground Refueling	
Small Boat Raids	
Amphibious Landing Rehearsal	
Mechanized Raid (Wet)	
Mechanized Raid (Dry)	
MEU Landing	
Major Highway Crossing	
Supporting Arms Coordinating Exercise (SACEX)	
Live Fire and/or Maneuver	
Non-combatant Evacuation Operation	
Tactical Exercise Control Group/Opposing Force (TECG/OPFOR) Requirements	
Withdrawal	

The activities listed above would involve the following elements:

Amphibious landings: This is the ship-to-shore movement of landing crafts (landing craft air cushion [LCAC] and landing craft utility [LCU]), amphibious assault vehicles, and small boats (Zodiacs). The landing crafts are used to transport all non-amphibious vehicles along with other equipment and troops. Based on the following operational criteria, potential locations were chosen and are identified after each criterion.

Ground movement: This is the movement of tracked and wheeled vehicles and troops on foot from landing sites to objective areas, from objective area to objective area, and from objective areas back to amphibious shipping (during withdrawal).

Aviation operations: Delivery of troops and equipment from ship to shore via a variety of helicopters that would land at designated landing zones scattered throughout the Eglin reservation and may include a fixed-wing escort. Aviation operations also occur during live fire exercises and can include weapons delivery from F/A-18 and A/V-8A aircraft.

Munitions use: Live fire from ground-based troops and vehicles as well as air delivery of larger munitions. This also includes the use of blank munitions during raids.

Pyrotechnics use: Raids on objective sites with opposing forces acting as resistance involves the use of pyrotechnics (smokes and flares). Additionally, the AAVs may deploy smoke when traveling from ship to shore.

***Infrastructure Improvements*:** Some activities would require infrastructure and site improvement to accommodate amphibious landings (i.e., site grading, tree clearing, and boat ramp construction) and tracked vehicle movement across Eglin (i.e., road widening).

Two alternatives to the proposed action were evaluated in this Environmental Assessment and are described in the following:

Alternative 1 (ARG/MEU Readiness Training with Minimal Site/Infrastructure Improvements)

Alternative 1 involves all the training activities as described under the Proposed Action with the exception of the listed site/infrastructure improvements. The beach landing sites could not be used during the MEU landing or withdrawal for LCACs or AAVs unless the site improvements were implemented. This alternative would allow the conduct of most of the training activities but would require the use of trucks and lowboys to haul tracked vehicles to the training areas. Additionally, without the necessary site improvements, some of the preferred alternative transportation routes for tracked vehicles could not accommodate the weight or width of the vehicles. Therefore, the major difference between this alternative and the preferred alternative is how the MEU will access the training area on the Eglin main reservation.

No-Action Alternative

Under the No-Action Alternative, the required training would not be performed at Eglin AFB. This would not provide the flexibility needed to maintain readiness, nor would it provide the Navy and Marine Corps with a new, unique training environment. The No-Action Alternative also represents the existing condition at Eglin AFB from which alternatives for conducting ARG/MEU training at Eglin are evaluated.

SUMMARY OF THE ANTICIPATED ENVIRONMENTAL EFFECTS

The following is a summary of the anticipated environmental effects of the Proposed Action. This section of the FONSI describes those issues that were the primary focus of the analysis done in the EA and the anticipated environmental impacts for each resource area. Each of these resource areas was analyzed in the EA, and the results are found in Chapter 4.

<u>Transportation</u>: The primary potential environmental impacts associated with transportation are related to short-term closures of highways and use of highways for military convoys while the MEU accesses the Eglin Military Reservation. The potential impacts to transportation will be insignificant because they will: be short in duration (30 minutes or less); be infrequent (only two 10-day training events per year); avoid peak traffic flow and holidays; and provide advance notification to local emergency and law enforcement authorities.

<u>Socioeconomics</u>: The primary potential environmental impacts associated with socioeconomics, which relates to aspects of employment, tourism, population, restricted access and environmental justice, are related to decreased public access to the Eglin Military Reservation and small areas of the Gulf of Mexico, positive impacts resulting from additional military activity at Eglin, and noise impacts on minority or low income communities. Because noise from the proposed action would not be disproportionately distributed into communities with increased numbers of low income or minority populations, there are no disproportionately high and adverse human health or environmental effects from the proposed action or alternatives to minority or low income populations. The overall socioeconomic impacts for the proposed training activities, both detrimental and beneficial, are minimal and not significant.

<u>Noise</u>: The primary potential environmental impacts associated with noise are related to amphibious landings at Wynnhaven Beach, aviation operations, and ARG/MEU live fire activities at Test Areas B-75 and C-52. Each of these activities would have some short-term impact to the community by increasing the average daily noise on the days these events are taking place. The modeling performed during analysis did not show significant increases in

average noise levels. The noise impacts will be insignificant because: the MEU will avoid nighttime (sleeping) hours for amphibious landings at Wynnhaven beach; the activities will occur 20 days per year or less; and live fire activities will not be done during weather conditions that would increase the noise levels that would leave the Eglin reservation.

Safety: The primary potential environmental impacts associated with safety are related to short-term road and waterway closures. The analysis of this resource area showed the potential impacts to be insignificant.

Wetlands: The primary potential environmental impacts associated with wetlands are related to site improvements at beach landing sites, AAVs driving through wetlands on Santa Rosa Island, and impacts associated with road and bridge improvements. Impacts to wetlands are being minimized by avoiding wetland areas whenever possible. In the areas where wetlands cannot be avoided, the effects will be mitigated in accordance with requirements from the Florida Department of Environmental Protection and the Army Corps of Engineers during the permitting process. Because the MEU is avoiding wetlands when possible and implementing appropriate mitigations as identified during the permitting process, the impacts to wetlands are not significant.

Floodplains: The primary potential environmental impacts associated with floodplains are related to the altering of shorelines to improve beach landing sites. No significant change to the floodplains would occur as a result of the proposed activities.

Water Quality: The primary potential environmental impacts associated with water quality are related to sediment disturbance at beach landing sites. These changes would not be significant because they are minimal and temporary. No significant impact to ground or surface waters would occur.

Air Quality: The primary potential environmental impacts associated with air quality are related to combustive emissions from ARG/MEU vessels, vehicles, aircraft, and munitions. The analysis of this resource area showed the potential impacts to be insignificant.

Soils/Erosion: The primary potential environmental impacts associated with soils/erosion are related to the potential for increased erosion resulting from loss of vegetation or modification to the shoreline at landing sites, ruts from tracked and wheeled vehicles in beach sand, road widening, and vehicle maneuvering on test areas. Engineering measures will be implemented to minimize erosion at beach landing sites and for road improvements. No significant soils/erosion impacts would occur.

HAZMAT/Solid Waste: The primary potential environmental impacts associated with HAZMAT/solid waste are related to the potential for inadvertent spills during rapid ground refueling. Spill control personnel would be on hand at all times during refueling operations, and other hazardous or solid waste would be collected in accordance with Eglin AFB existing procedures. No significant impacts from HAZMAT/solid waste would result.

Sensitive Species: The primary potential environmental impacts associated with sensitive species are related to amphibious vehicle impacts to sea turtles, road improvement impacts to flatwoods salamanders, and munitions noise impacts to red-cockaded woodpeckers. Monitoring and protection of sea turtles nests and relocation of nests from amphibious vehicle routes will minimize impacts to sea turtles. Road improvements (primarily widening) will be designed to

avoid flatwoods salamander habitat as much as possible by moving to the side of the road that does not have salamander habitat. Operating restrictions on artillery and mortar firing locations will be implemented to avoid noise impacts to red-cockaded woodpeckers. Observance of these and other management practices and mitigations developed during Section 7 Consultation with the U.S. Fish and Wildlife Service and the National Oceanic and Atmospheric Administration Office of Fisheries and stated in their Biological Opinion and Letter of Concurrence, respectively, will reduce potential impacts to less than significant. The USFWS Biological Opinion is located in Appendix L, and the NOAA Fisheries Letter of Concurrence is located in Appendix M.

Sensitive Habitats: The primary potential environmental impacts associated with sensitive habitats are related to potential impacts to seagrass in Santa Rosa Sound and dune habitat on Santa Rosa Island. Potential impacts will be minimized through avoidance. Surveys of the water transit area in Santa Rosa Sound have been conducted to identify areas with minimal or no seagrass vegetation so that these areas can be used and seagrass areas avoided. Other types of essential fish habitat would not be affected. Sensitive vegetative communities in the Eglin AFB interstitial areas would be avoided. Therefore, impacts to sensitive species are not significant.

Cultural Resources: The primary potential environmental impacts associated with cultural resources are related to disturbance during improving of beach landing sites. Impacts to cultural resources could potentially occur but would be minimized and mitigated to insignificance through Florida State Historic Preservation Office (SHPO) mandated survey and data recovery efforts at known cultural resource locations. The minimization and mitigation requirements were identified by the SHPO during Section 106 Consultation and are included in the Memorandum of Agreement between the SHPO and Eglin AFB, which is included in Appendix K. Data recovery would be conducted at beach landing sites. Cultural resource sites as marked on Eglin GIS maps would be avoided.

PRACTICABLE ALTERNATIVES

EOs 11988 and 11990 require Federal agencies that propose to conduct activities within a 100-year floodplain or wetland to consider alternatives to the action and/or modify its actions, to the extent feasible, to avoid adverse impacts or potential harm to floodplains and wetlands. These requirements are addressed in a separate Finding of No Practicable Alternative, which is attached and incorporated by reference.

MANAGEMENT REQUIREMENTS

Management requirements are self-imposed operational constraints that are being implemented in order to minimize anticipated environmental impacts associated with conducting ARG/MEU readiness training at Eglin AFB. These management requirements were developed in coordination with representatives from the U.S. Marine Corps, the U.S. Navy, and Eglin AFB. Where applicable, the appropriate regulatory agencies have also been involved in developing these management requirements. A summary of the primary management requirements for each resource area is stated below.

Transportation: An overall traffic management plan will be developed to establish a methodology for advance scheduling/notification and placement of road signs. Local emergency and law enforcement offices will be notified prior to road closures.

Socioeconomics: Advance scheduling/notification and avoidance of major tourist holidays will be implemented.

- Restricted Access: Advance notification through Notification to Mariners (NOTMARs) and Notification to Airmen (NOTAM) will be accomplished, and advance notification to recreational users will be implemented.
- Environmental Justice: No management requirements are needed for environmental justice.

Noise: LCAC landings will occur at Wynnhaven beach during daylight and early evenings (before 10 P.M.) only. Advanced public notification of training exercises will be implemented. Real-time noise modeling to incorporate the noise propagating effects of current weather conditions will be incorporated to manage bombing and artillery events.

Safety: Safety management requirements will include road, waterway, and range closures. Coordination with AAC/SEU and Hurlburt Field Ground Safety (SEOG) is required, and safety footprints are required for all live munitions. Air Force Safety procedures or USMC Safety procedures (whichever are more restrictive) will be used. UXO control measures will be followed. A Wildfire Operational Plan is required.

Wetlands: Wetland delineations have been accomplished to avoid these areas where possible and to identify minimally impactive amphibious crossing routes and landing locations. Wetlands will be avoided whenever possible. Wetland permits will specify impact mitigation measures. Construction best management practices would be employed for any improvement activity near wetland areas.

Floodplains: Digging in floodplains will be avoided when possible.

Water Quality: Engineering designs will be implemented to minimize erosion and resultant sedimentation of water bodies.

Air Quality: No management requirements are proposed.

Soils/Erosion: Trampling stream bank vegetation will be avoided. Seepage slopes, slopes, and steepheads will be avoided. Road improvements will adhere to BMPs as identified in the *Range Road Maintenance Handbook*. Off-road restrictions will be followed.

HAZMAT/Solid Waste: No new management requirements are necessary. Existing management requirements for HAZMAT/Solid Waste will be followed. All spills and accidental discharges will be reported via a Spill Discharge Report. Spills of over 25 gallons must be reported to Florida Department of Environmental Protection. Off-base spills must be reported to Eglin Public Affairs. Debris and refuse will be packed out. Post-mission surveys will occur to ensure debris removal.

Sensitive Species: Pyrotechnics use will follow Eglin's Specific Action Guide Restrictions. Flatwoods Salamander habitat will be avoided whenever possible for road widening. Sea turtle nests will be monitored and protected. Nests in the crossover corridor of Santa Rosa Island will be relocated to an area where there will not be amphibious vehicle movement. Safe standoff

distances from red-cockaded woodpecker cavity trees have been identified and will be followed during noise generating activities such as firing small arms or other artillery.

Sensitive Habitats: Wetland delineations and sea grass habitat surveys have been accomplished to avoid these areas where possible and to identify minimally impactive amphibious crossing routes and landing locations. Sensitive vegetative communities in the Eglin AFB interstitial areas will be avoided.

Cultural Resources: Avoidance of known cultural resource sites will be implemented. Barriers will be constructed around known sites where possible. When avoidance of sites is not feasible, a mitigation strategy will be developed with SHPO to recover cultural resources prior to site disturbance.

PUBLIC NOTICE

A public notice was published in the *Northwest Florida Daily News*, the *Bay Beacon*, the *Pensacola News Journal*, and the *Panama City News Herald* on 8 Mar 03 inviting the public to review and comment upon the Environmental Assessment and Draft Finding of No Significant Impact/Finding of No Practicable Alternative. The public comment period closed on 7 Apr 03. Two comments were received. Both comments were evaluated and considered but did not warrant any change to the analysis or conclusions. The first set of comments made general statements about noise levels, and the second set made general comments about noise and chemical residues and the level of significance.

FINDING OF NO PRACTICABLE ALTERNATIVE

Pursuant to Executive Order (EO) 11988, *Floodplain Management*, EO 11990, *Protection of Wetlands*, a Finding of No Practicable Alternative was made by the Vice Commander, Air Force Materiel Command. That FONPA is attached and incorporated by reference into this FONSI.

FINDING OF NO SIGNIFICANT IMPACT

Based on my review of the facts and the environmental analysis contained in the attached EA and as summarized above, I find the proposed decision of the Air Force to allow the U.S. Marine Corps and the U.S. Navy to conduct Amphibious Ready Group/Marine Expeditionary Unit (ARG/MEU) Readiness Training at Eglin AFB, FL, will not have a significant impact on the human environment insofar as the proposed action involves Air Force property or programs or requires Air Force approval. Therefore, an environmental impact statement is not required and will not be prepared by the Air Force.

Robert W. Chedister

ROBERT W. CHEDISTER
Major General, USAF
Commander, AAC

1 May 03
Date

FINDING OF NO PRACTICABLE ALTERNATIVE

FOR

Amphibious Ready Group/Marine Expeditionary Unit Readiness Training
Eglin AFB, Florida

Executive Order (EO) 11988, *Floodplains Management*, and EO 11990, *Protection of Wetlands*, require Federal agencies that propose to conduct activities within a 100-year floodplain or a wetland to consider alternatives to the action and/or modify its actions, to the extent feasible, to avoid adverse impacts or potential harm to floodplains and wetlands. The proposed Amphibious Ready Group/Marine Expeditionary Unit (ARG/MEU) Readiness Training at Eglin AFB, Florida, would require floodplain modification and may adversely impact wetlands. The nature and extent of these and other potential environmental impacts have been analyzed by the U.S. Marine Corps, in cooperation with the U.S. Air Force, in the Environmental Assessment (EA) "Amphibious Ready Group/Marine Expeditionary Unit Readiness Training." This EA was prepared in accordance with the Council on Environmental Quality Regulations for implementing the National Environmental Policy Act (NEPA) as promulgated at 40 Code of Federal Regulations Part 1500 (40 CFR §§1500-1508) and Air Force Instruction (AFI) 32-7061, *Environmental Impact Analysis Process*, as promulgated at 32 CFR Part 989, and it is the basis for this finding.

DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

Proposed Action

The Air Force proposes to allow the U.S. Marines and U.S. Navy to conduct ARG/MEU readiness training at Eglin AFB and Hurlburt Field. This training is anticipated to occur twice per year with each training event having a total duration of 10 days. A complete training event would involve seventeen different elements, of which only these two involve floodplains and wetlands:

Amphibious landings: This is the ship-to-shore movement of landing crafts (landing craft air cushion [LCAC] and landing craft utility [LCU]), amphibious assault vehicles (AAV), and small boats (Zodiacs). The landing crafts are used to transport all non-amphibious vehicles along with other equipment and troops. Infrastructure and site improvements necessary to accommodate amphibious landings consist of site grading, tree clearing, and boat ramp construction

Ground movement: This is the movement of tracked and wheeled vehicles and troops on foot from landing sites to objective areas, from objective area to objective area, and from objective areas back to amphibious shipping (during withdrawal). Some road widening will be necessary to accommodate tracked vehicle movement across Eglin.

Alternative 1 (ARG/MEU Readiness Training with Minimal Site/Infrastructure Improvements)

Alternative 1 involves all the training activities as described under the Proposed Action with the exception of certain site/infrastructure improvements. Under this alternative the beach landing sites would not be improved and therefore could not be used for LCAC or AAV landing or withdrawal. Instead, trucks and lowboys would be used to haul tracked vehicles to the training areas. Additionally, some of the preferred alternative transportation routes for tracked vehicles

would not accommodate the weight or width of the vehicles. Therefore, the major difference between this alternative and the preferred alternative is how the MEU will access the training area on the Eglin main reservation.

No-Action Alternative
Under the No-Action Alternative, the required training would not be performed at Eglin AFB. This would not provide the flexibility needed to maintain readiness, nor would it provide the Navy and Marine Corps with a new, unique training environment. The No-Action Alternative also represents the existing condition at Eglin AFB from which alternatives for conducting ARG/MEU training at Eglin are evaluated.

SUMMARY OF THE ANTICIPATED FLOODPLAIN/WETLAND EFFECTS

Wetlands: The primary potential environmental impacts associated with wetlands are related to site improvements at beach landing sites, AAVs driving through wetlands on Santa Rosa Island, and impacts associated with road and bridge improvements. Impacts to wetlands are being minimized by avoiding wetland areas whenever possible. In the areas where wetlands cannot be avoided, the effects will be mitigated in accordance with requirements from the Florida Department of Environmental Protection and the Army Corps of Engineers during the permitting process. Because the MEU is avoiding wetlands when possible and implementing appropriate mitigations as identified during the permitting process, the impacts to wetlands are not significant.

Floodplains: The primary potential environmental impacts associated with floodplains are related to the altering of shorelines to improve beach landing sites. No significant change to the floodplains would occur as a result of the proposed activities.

Water Quality: The primary potential environmental impacts associated with water quality are related to sediment disturbance at beach landing sites. These changes would not be significant because they are minimal and temporary. No significant impact to ground or surface waters would occur.

PRACTICABLE ALTERNATIVES

Amphibious landings: Necessarily, construction of boat ramps would have to take place within floodplain areas. These activities are needed to accommodate ARG/MEU training actions because Eglin does not have the appropriate infrastructure at needed land-water interface points. All alternative sites were considered for land-water interface locations. Because Eglin has limited capabilities in this area, all potential sites (Wynnhaven Beach and Hammock [TA D-84], White, Alaqua and East Bay Points) are being considered for site improvements. There are no practicable alternatives to improving the beach landing sites because they cannot accommodate amphibious vehicles in their current configuration and there are no existing sites that do not require improvements.

Ground movement: Another potential impact to wetlands and floodplains is the transit of Amphibious Assault Vehicles through these areas when using established movement corridors. All potential corridors were evaluated, and the corridors were chosen based on operational requirements. In order to minimize impacts to wetlands to the extent possible, corridors were routed around wetland areas where practicable. The total area of the disturbance within identified areas would be minimized to the extent practicable through engineering design, use of

best management practices, and implementation of permitted mitigations. The Proposed Action should not result in adverse impacts to the utility of wetland or floodplain areas.

MANAGEMENT REQUIREMENTS

Management requirements are self-imposed operational constraints that are being implemented in order to minimize anticipated environmental impacts associated with conducting ARG/MEU readiness training at Eglin AFB. These management requirements were developed in coordination with representatives from the U.S. Marine Corps, the U.S. Navy, and Eglin AFB. Where applicable, the appropriate regulatory agencies have also been involved in developing these management requirements.

Wetlands: Wetland delineations have been accomplished to avoid these areas where possible and to identify minimally impactive amphibious crossing routes and landing locations. Wetlands will be avoided whenever possible. Wetland permits will specify impact mitigation measures. Construction best management practices would be employed for any improvement activity near wetland areas.

Floodplains: Construction in floodplains will be avoided when possible.

Water Quality: Engineering designs will be implemented to minimize erosion and resultant sedimentation of water bodies.

PUBLIC NOTICE

A public notice was published in the *Northwest Florida Daily News*, the *Bay Beacon*, the *Pensacola News Journal*, and the *Panama City News Herald* on 8 March 2003 inviting the public to review and comment upon the Environmental Assessment and Draft Finding of No Significant Impact/Finding of No Practicable Alternative. The public comment period closed on 7 April 2003 and no comments on wetlands or floodplains were received.

FINDING OF NO PRACTICABLE ALTERNATIVE

Taking the above information into consideration, pursuant to Executive Order (EO) 11988, *Floodplain Management*, EO 11990, *Protection of Wetlands*, and the authority delegated by Secretary of the Air Force Order 791.1 as further redelegated, I find there is no practicable alternative to the actions proposed in floodplains and wetlands, and that the Proposed Action includes all practicable measures to minimize harm to the environment. This finding fulfills both the requirements of the referenced EOs and the Air Force *Environmental Impact Analysis Process* requirement (32 CFR 989.14) for a Finding of No Practicable Alternative.

Charles H. Coolidge Jr. — 24 Apr 2003

CHARLES H. COOLIDGE, JR.
Lieutenant General, USAF
Vice Commander, AFMC

Date

FINAL
FINDING OF NO SIGNIFICANT IMPACT

FOR
Amphibious Ready Group/Marine Expeditionary Unit Readiness Training
Eglin AFB, Florida

Pursuant to the Council on Environmental Quality regulations for implementing the procedural provisions of the National Environmental Policy Act (NEPA) promulgated at 40 Code of Federal Regulations 1500-1508 (40 CFR 1500-1508), and Department of the Navy procedures for implementing NEPA (32 CFR 755), the U.S. Marine Corps and U.S. Navy have conducted an Environmental Assessment (EA) of the probable environmental consequences for establishment of Amphibious Ready Group/Marine Expeditionary Unit (ARG/MEU) Readiness Training capability at Eglin Air Force Base (AFB), Florida. This document has been prepared in accordance with Executive Order (EO) 11988, Floodplains Management, and EA 11990, Protection of Wetlands as portions of the Proposed Action would occur within FEMA designated 100-year floodplains and wetlands regulated by the Clean Water Act.

DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

Proposed Action: The U.S. Marines and U.S. Navy propose to conduct ARG/MEU readiness training at Eglin AFB. The training of Marines and Sailors is anticipated to occur twice per year with each training event having a total duration of 10 days, or less if only a portion of the activities is conducted. It is possible that the training could only occur once during some years and possibly not at all in others. The following table lists the types of training activities that would occur under the Proposed Action, including locations. Detailed descriptions of each activity can be found in Chapter 2 of the EA.

MEU Training Activity	Locations
Insertion of Forward Command Element	Gulf of Mexico Santa Rosa Island Santa Rosa Sound Wynnhaven Beach Hammock Point (TA D-84) Alaqua Point White Point East Bay Choctawhatchee Bay Yellow River Eglin Airspace Eglin Interstitial Areas Eglin Test Areas Hurlburt Field
Insertion of Reconnaissance and Surveillance (R&S) Teams	
Ship Operations	
MEU Aviation Operations	
Helicopter Raids	
Rapid Ground Refueling	
Small Boat Raids	
Amphibious Landing Rehearsal	
Mechanized Raid (Wet)	
Mechanized Raid (Dry)	
MEU Landing	
Major Highway Crossing	
Supporting Arms Coordinating Exercise (SACEX)	
Live Fire and/or Maneuver	
Non-combatant Evacuation Operation	
Tactical Exercise Control Group/Opposing Force (TECG/OPFOR) Requirements	
Withdrawal	

The activities listed above would involve the following elements:

Amphibious landings: This is the ship-to-shore movement of landing crafts (landing craft air cushion [LCAC] and landing craft utility [LCU]), amphibious assault vehicles, and small boats (Zodiacs). The landing crafts are used to transport all non-amphibious vehicles along with other equipment and troops.

Ground movement: This is the movement of tracked and wheeled vehicles and troops on foot from landing sites to objective areas, from objective area to objective area, and from objective areas back to amphibious shipping (during withdrawal).

Aviation operations: Delivery of troops and equipment from ship to shore via a variety of helicopters that would land at designated landing zones scattered throughout the Eglin reservation and may include a fixed-wing escort. Aviation operations also occur during live fire exercises and can include weapons delivery from F/A-18 and A/V-8B aircraft.

Munitions use: Live fire from ground-based troops and vehicles as well as air-delivery of larger munitions. This also includes the use of blank munitions during raids.

Pyrotechnics use: Raids on objective sites with opposing forces acting as resistance involves the use of pyrotechnics (smokes and flares). Additionally, the AAVs may deploy smoke when traveling from ship to shore.

Infrastructure Improvements: Some activities would require infrastructure and site improvement to accommodate amphibious landings (i.e., site grading, tree clearing, and boat ramp construction) and tracked vehicle movement across Eglin (i.e., road widening).

Alternatives to the Proposed Action

Two alternatives to the proposed action were evaluated in this Environmental Assessment and are described as follows:

Alternative 1 (ARG/MEU Readiness Training with Minimal Site/Infrastructure Improvements)

Alternative 1 to the proposed action involves all the training activities as described under the proposed action, with the exception of certain site/infrastructure improvements. Because site improvements would not be implemented, the beach landing sites could not be used during the MEU landing or withdrawal for LCACs or AAVs. This alternative would allow the conduct of most of the training activities, but would require the use of trucks and lowboys to haul tracked vehicles to the training areas. Additionally, without the necessary site improvements, some of the preferred alternative transportation routes for tracked vehicles could not accommodate the weight or width of the vehicles. Therefore, the major difference between this alternative and the preferred alternative is how the MEU will access the training area on the Eglin main reservation.

Alternative 2 (No-Action Alternative)

Under the No-Action Alternative, the required training would not be performed at Eglin AFB. This would not provide the flexibility needed to maintain readiness, nor would it provide the Navy and Marine Corps with a new, unique training environment. The No-Action Alternative also represents the existing condition at Eglin AFB from which alternatives for conducting ARG/MEU training at Eglin are evaluated.

SUMMARY OF THE ANTICIPATED ENVIRONMENTAL EFFECTS

The following is a summary of the anticipated environmental effects of the Proposed Action. Each of these resource areas are analyzed in the EA, and the results are found in Chapter 4.

Transportation: The primary potential environmental impacts associated with transportation are related to short-term closures of highways and use of highways for military convoys while the MEU accesses the Eglin Military Reservation. The potential impacts to transportation will be insignificant because they will: be short in duration (30 minutes or less); be infrequent (only twice per year): avoid peak traffic flow and holidays; and provide advance notification to local emergency and law enforcement authorities.

Socioeconomics: The primary potential impacts associated with socioeconomics, which relates to aspects of employment, tourism, population, restricted access and environmental justice, are related to decreased public access to the Eglin Military Reservation and small areas of the Gulf of Mexico, positive impacts resulting from additional military activity at Eglin, and noise impacts on minority or low income communities. Because noise from the proposed action would not be disproportionately distributed into communities with increased numbers of low income or minority populations, there would be no significant environmental justice impacts. The overall socioeconomic impacts for the proposed training activities, both detrimental and beneficial, are minimal and not significant.

Noise: The primary potential environmental impacts associated with noise are related to amphibious landings at Wynnhaven Beach, aviation operations, and ARG/MEU live fire activities at Test Areas B-75 and C-52. Each of these activities would have some short-term impact to the community by increasing the average daily noise on the days these events take place. The modeling performed during analysis did not show significant increases in average noise levels. The noise impacts will be insignificant because: the MEU will avoid nighttime (sleeping) hours for amphibious landings at Wynnhaven beach; the activities will occur 20 days per year or less; and live fire activities will not be done during weather conditions that would increase the noise levels that would leave the Eglin reservation.

Safety: The primary potential environmental impacts associated with safety are related to short-term road and waterway closures. The analysis of this resource area showed the potential impacts to be insignificant.

Wetlands: The primary potential environmental impacts associated with wetlands are related to site improvements at beach landing sites, AAVs driving through wetlands on Santa Rosa Island, and impacts associated with road and bridge improvements. Impacts to wetlands will be minimized by avoiding wetland areas whenever possible. In the areas where wetland cannot be avoided, the effects will be mitigated in accordance with requirements from the Florida Department of Environmental Protection and the Army Corps of Engineers during the permitting process. Because the MEU is avoiding wetlands when possible and implementing appropriate mitigations as identified during the permitting process, the impacts to wetlands are not significant.

Floodplains: The primary potential environmental impacts associated with floodplains are related to the altering of shorelines to improve beach landing sites. No significant change to the floodplains would occur as a result of the proposed activities.

Water Quality: The primary potential environmental impacts associated with water quality are related to sediment disturbance at beach landing sites. These changes would not be significant because they are minimal and temporary. No significant impact to ground or surface waters would occur.

Air Quality: The primary potential environmental impacts associated with air quality are related to combustive emissions from ARG/MEU vessels, vehicles, aircraft, and munitions. The analysis of this resource area showed the potential impacts to be insignificant.

Soils/Erosion: The primary potential environmental impacts associated with soils/erosion are related to the potential for increased erosion resulting from loss of vegetation or modification to the shoreline at landing sites, ruts from tracked and wheeled vehicles in beach sand, road widening, and vehicle maneuvering on test areas. Engineering measures will be implemented to minimize erosion at beach landing sites and for road improvements. No significant soils/erosion impacts would occur.

HAZMAT/Solid Waste: The primary potential environmental impacts associated with HAZMAT/solid waste are related to the potential for inadvertent spills during rapid ground refueling. Spill control personnel would be on hand at all times during refueling operations, and other hazardous or solid waste would be collected in accordance with Eglin AFB existing procedures. No significant impacts from HAZMAT/solid waste would result.

Sensitive Species: The primary potential environmental impacts associated with sensitive species are related to amphibious vehicle effects on sea turtles, road improvement effects on flatwoods salamanders, and munitions noise effects on red-cockaded woodpeckers. In compliance with the Biological Opinion issued by the U.S. Fish and Wildlife Service for the proposed action, monitoring and protection of sea turtles nests and relocation of nests from amphibious vehicle routes will minimize impacts to sea turtles. Road improvements (primarily widening) will be designed to avoid flatwoods salamander habitat as much as possible by moving to the side of the road that does not have salamander habitat. Operating restrictions on artillery and mortar firing locations will be implemented to avoid noise impacts to red-cockaded woodpeckers. Observance of these and other management practices and mitigations developed during coordination with the U.S. Fish and Wildlife Service and the National Oceanic and Atmospheric Administration Office of Fisheries will reduce potential impacts to less than significant.

Sensitive Habitats: The primary potential environmental impacts associated with sensitive habitats are related to potential impacts to seagrass in Santa Rosa Sound and dune habitat on Santa Rosa Island. Potential impacts will be minimized through avoidance. Surveys of the water transit area in Santa Rosa Sound have been conducted to identify areas with minimal or no sea grasses vegetation so that these areas can be used and sea grass areas avoided. Other types of essential fish habitat would not be affected. Sensitive vegetative communities in the Eglin AFB interstitial areas would be avoided. Therefore, impacts to sensitive species are not significant.

Cultural Resources: The primary potential environmental impacts associated with cultural resources are related to disturbance during improving of beach landing sites. In compliance with a Memorandum Of Agreement between Eglin AFB, the Marine Corps, and Florida State Historic Preservation Officer, impacts to cultural resources that could potentially occur would be minimized and mitigated to insignificance through mandated survey and data recovery efforts at

known cultural resource locations. Data recovery would be conducted at beach landing sites. Cultural resource sites as marked on Eglin GIS maps would be avoided.

PRACTICABLE ALTERNATIVES

EOs 11988 and 11990 require Federal agencies that propose to conduct activities within a 100-year floodplain or wetland to consider alternatives to the action and/or modify its actions, to the extent feasible, to avoid adverse impacts or potential harm to floodplains and wetlands. Necessarily, construction of boat ramps would have to take place within floodplain areas. These activities are needed to accommodate ARG/MEU training actions because Eglin does not have the appropriate infrastructure at needed land-water interface points. All alternative sites were considered for land-water interface locations. Because Eglin has limited capabilities in this area, all potential sites (Wynnhaven Beach and Hammock (TA D-84), White, Alaqua and East Bay Points) are being considered for site improvements. There are no practicable alternatives to improving the beach landing sites because they cannot accommodate amphibious vehicles in their current configuration and no existing sites provide the required improvements. Another potential impact to wetlands and floodplains is the transit of Amphibious Assault Vehicles (AAV) through these areas when using established movement corridors. All potential corridors were evaluated, and the corridors were chosen based on operational requirements. In order to minimize impacts to wetlands to the extent possible, corridors were routed around wetland areas where practicable. The total area of the disturbance within identified areas would be minimized to the extent practicable through engineering design, use of best management practices, and implementation of permitted mitigations. The Proposed Action should not result in adverse impacts to the utility of wetland or floodplain areas.

The Proposed Action was evaluated through the environmental impact analysis process, actions were considered to avoid the effects of construction and AAV use in floodplains and wetlands, and actions were designed to avoid and/or minimize, to the extent possible, potential harm to the environment. The measures to minimize the potential for impacts have been documented within the EA and no practicable alternatives to infrastructure improvements or AAV use within floodplain areas or wetlands have been identified.

MANAGEMENT REQUIREMENTS

Management requirements are self-imposed operational constraints or modifications that are being implemented in order to minimize anticipated environmental impacts associated with conducting ARG/MEU readiness training at Eglin AFB. These management requirements were developed in coordination with representatives from the US Marine Corps, the US Navy, and Eglin AFB. Where applicable, the appropriate regulatory agencies have also been involved in developing these management requirements. A summary of the primary management requirements for each resource area is stated below.

<u>Transportation</u>: An overall traffic management plan will be developed to establish a methodology for advance scheduling/notification and placement of road signs. Local emergency and law enforcement offices will be notified prior to road closures.

<u>Socioeconomics</u>: Advance scheduling/notification and avoidance of major tourist holidays will be implemented.

- Restricted Access: Advance notification through Notification to Mariners (NOTMARS) and Notification to Airmen (NOTAM) will be accomplished, and advance notification to recreational users will be implemented.
- Environmental Justice: No management requirements are needed for environmental justice.

Noise: LCAC landings would occur at Wynnhaven beach during daylight and early evenings (before 10pm) only. Advanced public notification of training exercises will be implemented. Real-time noise modeling to incorporate the noise propagating effects of current weather conditions will be incorporated to manage bombing and artillery events.

Safety: Safety management requirements will include road, waterway, and range closures. Coordination with AAC/SEU is required, and safety footprints are required for all live munitions. AAC Safety procedures or USMC Safety procedures (whichever are more restrictive) will be used. UXO control measures will be followed. Eglin AFB will prepare a Wildfire Operational Plan.

Wetlands: Wetlands will be avoided whenever possible. Wetland permits will specify impact mitigation measures. Construction BMPs would be employed for any improvement activity near wetland areas. All digging will be coordinated with appropriate AAC branches.

Floodplains: Digging in floodplains will be avoided when possible.

Water Quality: Engineering designs will be implemented to minimize erosion and resultant sedimentation of water bodies.

Air Quality: No management requirements are proposed.

Soils/Erosion: Trampling stream bank vegetation will be avoided. Seepage slopes, slopes and steepheads will be avoided. Road improvements will adhere to BMPs as identified in the *Range Road Maintenance Handbook*. Off-road restrictions will be followed.

HAZMAT/Solid Waste: No new management requirements are necessary. Existing management requirements for HAZMAT/Solid Waste would be followed. All spills and accidental discharges will be reported via a Spill Discharge Report. Spills of over 25 gallons must be reported to FDEP. Off-base spills must be reported to Eglin Public Affairs. Debris and refuse will be packed out. Post-mission surveys will occur to ensure debris removal.

Sensitive Species: Pyrotechnics use will follow Eglin's Specific Action Guide Restrictions. Flatwoods Salamander habitat will be avoided whenever possible for road widening. Sea turtle nests will be monitored and protected. Nests in the crossover corridor of Santa Rosa Island will be relocated to an area where there will not be amphibious vehicle movement. Safe stand-off distances from red-cockaded woodpecker cavity trees have been identified and will be followed during noise generating activities such as firing small arms or artillery.

Sensitive Habitats: Wetland delineations and sea grass habitat surveys have been accomplished to avoid these areas where possible and to identify minimally impactive amphibious crossing routes and landing locations. Sensitive vegetative communities in the Eglin AFB interstitial areas will be avoided.

Cultural Resources: Avoidance of known cultural resource sites will be implemented. Barriers will be constructed around known sites where possible. When avoidance of sites is not feasible, a mitigation strategy will be developed with SHPO to recover cultural resources prior to site disturbance.

FINDING OF NO SIGNIFICANT IMPACT

Based on my review of the Environmental Assessment, and the environmental analysis included therein as summarized above, I conclude that the proposed action of Marine Expeditionary Unit Readiness Training at Eglin AFB, Florida, would not have a significant adverse impact of a long-term nature to the quality of the human or natural environment. This analysis fulfills the requirements of the National Environmental Policy Act, the Council on Environmental Quality Regulations, and Department of the Navy procedures for implementing the National Environmental Policy Act, 32 CFR 775, and an environmental impact statement is not required and will not be prepared.

Thomas S. Jones
Major General, US Marine Corps
Commanding General, Training and Education Command

AMPHIBIOUS READY GROUP/ MARINE EXPEDITIONARY UNIT READINESS TRAINING

FINAL ENVIRONMENTAL ASSESSMENT

APRIL 11, 2003

AMPHIBIOUS READY GROUP/MARINE EXPEDITIONARY UNIT READINESS TRAINING ENVIRONMENTAL ASSESSMENT

Lead Agencies:
United States Marine Corps, Department of the Navy
Cooperating Agency:
United States Air Force

ABSTRACT

This Environmental Assessment (EA) has been prepared by the United States Marine Corps and the Department of the Navy (DON) in accordance with the National Environmental Policy Act of 1969 (NEPA), 42 United States Code (USC) §§ 4321-4370d, as implemented by the Council on Environmental Quality (CEQ) regulations, 40 Code of Federal Regulations (CFR) Parts 1500-1508, the guidelines contained in the Chief of Naval Operations Environmental and Natural Resources Program Manual Instruction (OPNAVINST) 5090.1B dated 9 September 1999, and Marine Corps Order (MCO) 5090.2A, Chapter 12, dated 10 July 1998, Environmental Compliance and Protection Manual, which establish procedures for implementing NEPA. The Proposed Action involves the conduct of Amphibious Ready Group/Marine Expeditionary Unit training at Eglin Air Force Base (AFB) water and land test and training ranges. The training would occur no more than twice yearly and would not exceed a 10-day duration for a given ARG/MEU training event. Access of amphibious craft into the Eglin Military Complex would be accomplished through military owned land-water interfaces. Fixed-wing and rotary aircraft would engage in live fire operations on test areas currently designated for that purpose. Ship operations would involve launch and retrieval of aircraft and amphibious vessels and would occur within a 5 by 20 nautical mile area approximately 1 to 6 nautical miles offshore. Tracked and wheeled vehicles would conduct maneuvering and live fire in approved areas. Potential amphibious access points into the Eglin reservation include Santa Rosa Island, Wynnhaven Beach, White Point, Hurlburt Field Gravel Offloading Site, Hammock Point (Test Area D-84), East Bay Point, Yellow River, and Alaqua Point. Some site modifications (e.g., boat landing ramps and staging areas) and infrastructure improvements (e.g., roads, bridges, and culverts) would be required at several locations. This EA evaluates potential impacts to the following resources: Transportation, Socioeconomics, Noise, Safety, Wetlands, Floodplains, Water Quality, Air Quality, Soils/Erosion, HAZMAT/Solid Waste, Sensitive Species, Sensitive Habitats, and Cultural Resources. In addition to the Proposed Action, an Action Alternative and a No-Action Alternative were evaluated. The Action Alternative, or Alternative 1, is to conduct ARG/MEU training at Eglin AFB and Hurlburt Field with only minimal site and infrastructure improvements.

Questions regarding this EA may be directed to:

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AMPHIBIOUS READY GROUP/ MARINE EXPEDITIONARY UNIT READINESS TRAINING

FINAL ENVIRONMENTAL ASSESSMENT

U.S. Marine Corps
Department of the Navy
Air Armament Center (Cooperating Agency)
Eglin Air Force Base, FL 32542

April 11, 2003

PRINTED ON RECYCLED PAPER

EXECUTIVE SUMMARY

Amphibious Ready Group/Marine Expeditionary Unit (ARG/MEU) Readiness Training Environmental Assessment

Description of Proposed Action and Alternatives: This Environmental Assessment (EA) has been prepared to evaluate potential impacts of ARG/MEU readiness training at Eglin AFB.

Proposed Action:

Mission Description

The U.S. Marines and U.S. Navy propose to conduct ARG/MEU readiness training at Eglin AFB. The training of Marines and Sailors is anticipated to occur twice per year with each training event having a total duration of 10 days, or less if only a portion of the activities is conducted. It is possible that the training could only occur once during some years and possibly not at all in others. Table ES-1 lists the types of training activities that would occur under the Proposed Action, including locations. Detailed descriptions of each activity are provided in Chapter 2.

Table ES-1. Activities and Locations of Proposed ARG/MEU Readiness Training

ARG/MEU Training Activity	Locations
Insertion of Forward Command Element	Gulf of Mexico Santa Rosa Island Santa Rosa Sound Wynnhaven Beach Alaqua Point Hammock Point (Test Area D-84) White Point East Bay Choctawhatchee Bay Yellow River Eglin Airspace Eglin Interstitial Areas Eglin Test Areas Hurlburt Field
Insertion of Reconnaissance and Surveillance (R&S) Teams	
Ship Operations	
MEU Aviation Operations	
Helicopter Raids	
Rapid Ground Refueling	
Small Boat Raids	
Amphibious Landing Rehearsal	
Mechanized Raid (Wet)	
Mechanized Raid (Dry)	
MEU Landing	
Major Highway Crossing	
Supporting Arms Coordinating Exercise (SACEX)	
Live Fire and/or Maneuver	
Non-combatant Evacuation Operation	
Tactical Exercise Control Group/Opposing Force (TECG/OPFOR) Requirements	
Withdrawal	

The activities listed above would involve the following elements.

Amphibious landings: This is the ship-to-shore movement of landing crafts (landing craft air cushion [LCAC] and landing craft utility [LCU]), amphibious assault vehicles, and small boats (Zodiacs). The landing crafts are used to transport all non-amphibious vehicles along with other equipment and ground forces. Based on the following operational criteria, potential locations were chosen and are identified after each criterion.

Ground movement: Movement of tracked and wheeled vehicles and troops on foot from landing sites to objective areas, from objective area to objective area, and from objective areas back to amphibious shipping (during withdrawal).

Aviation operations: Delivery of troops and equipment from ship to shore via a variety of helicopters that would land at designated landing zones scattered throughout the Eglin reservation and may include a fixed-wing escort. Aviation operations also occur during live fire exercises and can include weapons delivery from F/A-18 and AV-8B aircraft.

Munitions use: Live fire from ground-based troops and vehicles as well as air delivery of larger munitions. This also includes the use of blank munitions during raids.

Pyrotechnics use: Raids on objective sites with opposing forces acting as resistance involving the use of pyrotechnics (smokes and flares). Additionally, the AAVs may deploy smoke when traveling from ship to shore.

Ship Operations: Transport of the MEU to be conducted by the Navy Amphibious Ready Group, which consists of 3 amphibious ships and 2 to 3 cruisers/destroyers. Transport would occur from an inner transport area, which is essentially a 5 by 20 mile rectangular box approximately 1 to 6 nautical miles offshore. During the 10-day exercise, ARG ships will normally remain within the inner transport area at slow speed (5 to 10 knots). The ARG ships will be involved in the launch and recovery of aircraft and amphibious vessels.

Site/Infrastructure Improvements

Some activities would require infrastructure and site improvement to accommodate amphibious landings (i.e., site grading, tree clearing, and boat ramp construction) and tracked vehicle movement across Eglin (i.e., road widening) as shown in Table ES-2.

Table ES-2. Proposed Site/Infrastructure Modifications

Location	Improvement/Modification
Santa Rosa Island	Bury approximately 300 feet of power line along Santa Rosa Island Road near TS A-13B to allow for more LCAC crossing area. Construct a concrete pad on the road near TS A-13B to accommodate track vehicle crossings and loading onto trucks.
Wynnhaven Beach	Tree clearing, site grading to shoreline, and construction of a gravel staging area to allow for amphibious craft landings and offloading.
East Bay Point	Tree clearing, site grading to shoreline, and construction of a gravel staging area to allow for amphibious craft landings and offloading.
TA D-84	Site grading to shoreline to allow for amphibious craft landings and offloading.
Alaqua Point	Site grading to shoreline to allow for amphibious craft landings and offloading.
White Point	Minor tree clearing.
Yellow River	None.
Hurlburt Field Gravel Offloading Site (GOS)	None.

Potential Environmental Impacts

The following is a summary of the anticipated environmental effects of the Proposed Action. Detailed information on the analysis and anticipated impacts can be found in Chapter 4 of the EA.

Transportation: The primary potential environmental impacts associated with transportation are related to short-term closures of highways and use of highways for military convoys while the MEU accesses the Eglin Military Reservation. The potential impacts to transportation will be insignificant because they will: be short in duration (30 minutes or less); be infrequent (only twice per year); avoid peak traffic flow and holidays; and provide advance notification to local emergency and law enforcement authorities.

Socioeconomics: Socioeconomics includes aspects of employment, population, tourism, and environmental justice that may be affected by the proposed action. The primary potential environmental impacts associated with socioeconomics are related to decreased public access to the Eglin Military Reservation and small areas of the Gulf of Mexico, as well as positive impacts resulting from additional military activity at Eglin. The overall socioeconomic impacts for the proposed training activities, both detrimental and beneficial, are minimal and not significant. The primary potential environmental impacts associated with environmental justice are related to noise input into the community. Because the noise is not being disproportionately distributed into communities with increased numbers of low income or minority populations, there would be no significant impacts related to environmental justice.

Noise: The primary potential environmental impacts associated with noise are related to amphibious landings at Wynnhaven Beach, aviation operations, and ARG/MEU live fire activities at Test Areas B-75 and C-52. Each of these activities would have some short-term impact to the community by increasing the average daily noise on the days these events are taking place. The modeling performed during analysis did not show significant increases in average noise levels. The noise impacts will be insignificant because: the MEU will avoid nighttime (sleeping) hours for amphibious landings at Wynnhaven Beach; the activities will occur 20 days per year or less; and live fire activities will not be done during weather conditions that would increase the noise levels that would leave the Eglin reservation.

Safety: Road and waterway closures would ensure no significant safety impacts would occur. Coordination with Eglin's Safety Office (AAC/SEU) and Hurlburt Field Ground Safety (SEOG) would occur to ensure that Marines avoid digging in areas where unexploded ordnance is a concern. Adherence to Eglin's wildfire management protocols will ensure no significant safety impacts associated with mission-related wildfires.

Wetlands: The primary potential environmental impacts associated with wetlands are related to site improvements at beach landing sites, AAVs driving through wetlands on Santa Rosa Island, and impacts associated with road and bridge improvements. Impacts to wetlands are being minimized by avoiding wetland areas whenever possible. In the areas where wetlands cannot be avoided, the effects will be mitigated in accordance with requirements from the Florida Department of Environmental Protection and the Army Corps of Engineers during the permitting process. Because the MEU is avoiding wetlands when possible and implementing appropriate

mitigations as identified during the permitting process, the impacts to wetlands are not significant.

Floodplains: The primary potential environmental impacts associated with floodplains are related to the altering of shorelines to improve beach landing sites. No significant change to the floodplains would occur as a result of the proposed activities.

Water Quality: The primary potential environmental impacts associated with water quality are related to sediment disturbance at beach landing sites. These changes would not be significant because they are minimal and temporary. No significant impact to ground or surface waters would occur.

Air Quality: The primary potential environmental impacts associated with air quality are related to combustive emissions from ARG/MEU vessels, vehicles, aircraft, and munitions. The analysis of this resource area showed the potential impacts to be insignificant.

Soils/Erosion: The primary potential environmental impacts associated with soils/erosion are related to the potential for increased erosion resulting from loss of vegetation or modification to the shoreline at landing sites, ruts from tracked and wheeled vehicles in beach sand, road widening, and vehicle maneuvering on test areas. Engineering measures will be implemented to minimize erosion at beach landing sites and for road improvements. No significant soils/erosion impacts would occur.

HAZMAT/Solid Waste: The primary potential environmental impacts associated with HAZMAT/solid waste are related to the potential for inadvertent spills during rapid ground refueling. Spill control personnel would be on hand at all times during refueling operations, and other hazardous or solid waste would be collected in accordance with Eglin AFB existing procedures. No significant impacts from HAZMAT/solid waste would result.

Sensitive Species: The primary potential environmental impacts associated with sensitive species are related to amphibious vehicle impacts to sea turtles, road improvement impacts to flatwoods salamanders, and munitions noise impacts to red-cockaded woodpeckers. Monitoring and protection of sea turtles nests and relocation of nests from amphibious vehicle routes will minimize impacts to sea turtles. Road improvements (primarily widening) will be designed to avoid flatwoods salamander habitat as much as possible by moving to the side of the road that does not have salamander habitat. Operating restrictions on artillery and mortar firing locations will be implemented to avoid noise impacts to red-cockaded woodpeckers. Observance of these and other management practices and mitigations developed during coordination with the U.S. Fish and Wildlife Service and the National Oceanic and Atmospheric Administration Office of Fisheries will reduce potential impacts to less than significant.

Sensitive Habitats: The primary potential environmental impacts associated with sensitive habitats are related to potential impacts to seagrass in Santa Rosa Sound and dune habitat on Santa Rosa Island. Potential impacts will be minimized through avoidance. Surveys of the water transit area in Santa Rosa Sound have been conducted to identify areas with minimal or no seagrass vegetation so that these areas can be used and seagrass areas avoided. Other types of essential fish habitat would not be affected. Sensitive vegetative communities in the Eglin AFB interstitial areas would be avoided. Therefore, impacts to sensitive species are not significant.

Cultural Resources: Impacts to cultural resources would potentially occur but would be minimized and mitigated through Florida State Historic Preservation Office (SHPO) mandated survey and data recovery efforts at known cultural resource locations. Data recovery would be conducted where adverse effects cannot be avoided. All other sites would be avoided through marking on Eglin and Hurlburt GIS maps and in the field. A memorandum of agreement with the SHPO, which will be completed in April 2003, will formalize the steps required to avoid or mitigate adverse effects.

Management Requirements

Management requirements are self-imposed operational constraints that are being implemented in order to minimize anticipated environmental impacts associated with conducting ARG/MEU readiness training at Eglin AFB. These management requirements were developed in coordination with representatives from the U.S. Marine Corps (USMC), the U.S. Navy, and Eglin AFB. Where applicable, the appropriate regulatory agencies have also been involved in developing these management requirements. Some examples of these management requirements are described below by resource. More detailed information can be found in Chapter 5 of the Environmental Assessment.

Transportation: An overall traffic management plan will be developed to establish a methodology for advance scheduling/notification and placement of road signs. Local emergency and law enforcement offices will be notified prior to road closures.

Socioeconomics: Advance scheduling/notification and avoidance of major tourist holidays will be implemented.

- Restricted Access: Advance notification through Notification to Mariners (NOTMARs) and Notification to Airmen (NOTAM) will be accomplished, and advance notification to recreational users will be implemented.
- Environmental Justice: No management requirements are needed for environmental justice.

Noise: LCAC landings will occur at Wynnhaven Beach during daylight and early evenings (before 10 P.M.) only. Advanced public notification of training exercises will be implemented. Real-time noise modeling to incorporate the noise propagating effects of current weather conditions will be incorporated to manage bombing and artillery events.

Safety: Safety management requirements will include road, waterway, and range closures. Coordination with AAC/SEU and Hurlburt Field Ground Safety (SEOG) is required, and safety footprints are required for all live munitions. Air Force Safety procedures or USMC Safety procedures (whichever are more restrictive) will be used. UXO control measures will be followed. A Wildfire Operational Plan is required.

Wetlands: Wetlands will be avoided whenever possible. Wetland permits will specify impact mitigation measures. Construction BMPs would be employed for any improvement activity near wetland areas. All digging will be coordinated with appropriate AAC branches.

Floodplains: Digging in floodplains will be avoided when possible.

Water Quality: Engineering designs will be implemented to minimize erosion and resultant sedimentation of water bodies.

Air Quality: No management requirements are proposed.

Soils/Erosion: Trampling stream bank vegetation will be avoided. Seepage slopes, slopes, and steepheads will be avoided. Road improvements will adhere to BMPs as identified in the *Range Road Maintenance Handbook*. Off-road restrictions will be followed.

HAZMAT/Solid Waste: No new management requirements are necessary. Existing management requirements under AAC Plan 32-5 for HAZMAT/Solid Waste will be followed. All spills and accidental discharges will be reported via a Spill Discharge Report. Spills of over 25 gallons must be reported to FDEP. Off-base spills must be reported to Eglin Public Affairs. Debris and refuse will be packed out. Post-mission surveys will occur to ensure debris removal.

Sensitive Species: Pyrotechnics use will follow Eglin's Specific Action Guide Restrictions. Flatwoods Salamander habitat will be avoided whenever possible for road widening. Sea turtle nests will be monitored and protected. Nests in the crossover corridor of Santa Rosa Island will be relocated to an area where there will not be amphibious vehicle movement. Safe standoff distances from red-cockaded woodpecker cavity trees have been identified and will be followed during noise generating activities such as firing small arms or other artillery.

Sensitive Habitats: Wetland delineations and sea grass habitat surveys have been accomplished to avoid these areas where possible and to identify minimally impactive amphibious crossing routes and landing locations. Sensitive vegetative communities in the Eglin AFB interstitial areas will be avoided.

Cultural Resources: Avoidance of known cultural resource sites will be implemented. Barriers will be constructed around known sites where possible. When avoidance of sites is not feasible, a mitigation strategy will be developed with SHPO to recover cultural resources prior to site disturbance.

Alternative 1 (ARG/MEU Readiness Training with Minimal Site/Infrastructure Improvements):

Alternative 1 involves all the training activities as described under the Proposed Action, with the exception of the listed site/infrastructure improvements. Without improvements, the beach landing sites at Alaqua, East Bay, and Hammock (TA D-84) Points as well as Wynnhaven Beach, cannot accommodate LCAC landings and offloadings or AAV landings. Thus, these beach landing sites could not be used during the MEU landing or withdrawal unless the site improvements were implemented. This alternative would allow the conduct of most of the training activities but would require administrative access to Eglin's mainland reservation training areas. Administrative access refers mainly to the use of trucks and lowboys to haul tracked vehicles to the training areas. Additionally, without the necessary site improvements, some of the preferred alternative transportation routes for tracked vehicles could not accommodate the weight or width of the vehicles. Therefore, the major difference between this

alternative and the preferred alternative is how the MEU will access the training area on the Eglin main reservation. As a result, the impacts would be less in terms of the amount of infrastructure improvements undertaken with this alternative. However, impacts associated with training activities would be the same as those described under the Proposed Action, and the same management requirements would apply.

No-Action Alternative

Under the No-Action Alternative, the required training would not be performed at Eglin AFB. This would not provide the flexibility needed to maintain readiness, nor would it provide the Navy and Marine Corps with a new, unique training environment. The No-Action Alternative also represents the existing condition at Eglin AFB from which alternatives for conducting ARG/MEU training at Eglin are evaluated.

Conclusions

Management requirements for potential impacts to transportation, cultural resources, wetlands, and threatened and endangered species will be implemented. Adhering to these management requirements will ensure that no significant impacts will occur in accordance with the National Environmental Policy Act (NEPA).

Therefore, a finding of no significant impact is recommended to document that further analysis associated with an Environmental Impact Statement is not required.

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LIST OF ACRONYMS AND ABBREVIATIONS

96 CED/CEG	Explosive Ordnance Disposal Flight
AAAV	Advanced Amphibian Assault Vehicle
AAC	Air Armament Center
AAC/EMCE	Air Armament Center, Environmental Engineering
AAC/EMH	Air Armament Center, Cultural Resources Branch
AAC/EMSN	Air Armament Center, Natural Resources Management
AAC/PA	Air Armament Center, Public Affairs Office
AAC/SE	Air Armament Center, Directorate of Safety
AAC/SEOG	Air Armament Center, Eglin Ground Safety
AAC/SEU	Air Armament Center, Range Safety Office
AADT	Average Annual Daily Traffic
AAV	Amphibious Assault Vehicle
ACE	U.S. Army Corps of Engineers
AFB	Air Force Base
AFI	Air Force Instruction
AFMAN	Air Force Manual
AFMC	Air Force Material Command
AFOSH	Air Force Occupational and Environmental Safety, Fire Protection, and Health
AGL	Above Ground Level
AICUZ	Air Installation Compatible Use Zone Program
AQCR	Air Quality Control Region
ARG	Amphibious Ready Group
ARPA	Archaeological Resources Protection Act
ATSDR	Agency for Toxic Substances and Disease Registry
ATV	All Terrain Vehicles
BA	Biological Assessment
BASH	Bird Aircraft Strike Hazard
BLZ	Beach Landing Zone
BMP	Best Management Practices
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFA	Controlled Firing Area
CFR	Code of Federal Regulations
cm	Centimeters
CO	Carbon Monoxide
CO_2	Carbon Dioxide
COMTUEX	Navy Composite Training Unit Exercise
CY	Calendar Year
CZMA	Coastal Zone Management Act
dB	Decibel
dBA	A-Weighted Decibels
dBC	C-Weighted Decibels
dbh	Diameter at Breast Height
dBP	Maximum Acoustic Pressure in Decibels
DoD	Department of Defense
DOF	Department of Forestry
DON	Department of the Navy
DOT	Department of Transportation
DZ	Drop Zone
EA	Environmental Assessment
EAFB	Eglin Air Force Base
EFH	Essential Fish Habitat
EGTTR	Eglin Gulf Test and Training Range

LIST OF ACRONYMS AND ABBREVIATIONS CONT'D

EMR	Eglin Mainland Reservation
EMS	Emergency Medical Services
EO	Executive Order
EOD	Explosive Ordnance Disposal
EPCRA	Emergency Planning and Community Right-to-Know
ESA	Endangered Species Act
EWTA	Eglin Water Test Area
F	Fahrenheit
FAA	Federal Aviation Administration
FAC	Florida Administrative Code
FCMP	Florida Coastal Management Program
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
FEMA	Federal Emergency Management Agency
FNAI	Florida Natural Areas Inventory
FONPA	Finding of No Practicable Alternative
FPCON	Force Protection Condition
FWC	Florida Fish and Wildlife Conservation Commission
FWRA	Florida Watershed Restoration Act
FY	Fiscal Year
GCPEP	Gulf Coastal Plain Ecosystem Partnership
GIS	Geographic Information System
GOM	Gulf of Mexico
GOS	Gravel Offloading Site
GPS	Global Positioning System
GSMFC	Gulf States Marine Fisheries Commission
HLZ	Helicopter Landing Zone
HMMWV	High Mobility Multipurpose Wheeled Vehicle
HUD	Housing and Urban Development
HWY	Highway
Hz	Hertz
IDLH	Immediately Dangerous to Life And Health
INBS	Index Nesting Beach Survey
IRP	Installation Restoration Program
JLOTS	Joint Logistics Over the Shore
JTFEX	Joint Task Force Exercise
km^2	Square Kilometers
LAV	Light Armored Vehicle
LCAC	Landing Craft Air Cushion
LCU	Landing Craft Utility
L_{dn}	Day-Night Average Sound Level
L_{eq}	Equivalent Sound Level
LOS	Levels of Service
LTO	Landing-Take Off
LUC	Land Use Control
LZ	Landing Zone
MCO	Marine Corps Order
MEU	Marine Expeditionary Unit
mg/dL	Milligrams per Deciliter
mg/kg	Milligrams per Kilogram
mg/L	Milligrams per Liter
MHW	Mean High Water
mi^2	Square Mile(s)
ml	Milliliter
MMPA	Marine Mammal Protection Act

LIST OF ACRONYMS AND ABBREVIATIONS CONT'D

MOA	Memorandum of Agreement
MPA	Marine Protected Area
mph	Miles per Hour
MSDS	Material Safety Data Sheets
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NAPS	Noise Assessment And Prediction Model
NEO	Non-Combatant Evacuation Operations
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NIPRNet	Non-Classified Internet Protocol Router Network
NMFS	National Marine Fisheries Service
NO	Nitric Oxide
NO_2	Nitrogen Dioxide
NOAA	National Oceanic and Atmospheric Administration
NOTAM	Notice to Airmen
NOTMAR	Notice to Mariners
NO_x	Nitrogen Oxides
NPDES	National Pollutant Discharge Elimination System
NPS	Non-Point Source
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
O_3	Ozone
OFW	Outstanding Florida Waters
OPNAVINST	Chief of Naval Operations Environmental and Natural Resources Program Manual Instruction
OSHA	Occupational Safety and Health Act
Pb	Lead
PEP	Propellant, Energetic, and Pyrotechnics
PM_{10}	Particulate Matter With a Diameter Less Than or Equal to 10 Microns
$PM_{2.5}$	Particulate Matter With a Diameter Less Than or Equal to 2.5 Microns
POL	Petroleum, Oil, and Lubricant
ppm	Parts per Million
PTA	Prentice Thomas Associates
R&S	Reconnaissance and Surveillance
RCRA	Resource Conservation and Recovery Act
RCW	Red-cockaded Woodpecker
RGR	Rapid Ground Refueling
ROI	Region of Influence
RR	Range Road
RUR	Range Utilization Report
SACEX	Supporting Arms Coordinating Exercise
SAV	Submerged Aquatic Vegetation
SEL	Sound Exposure Level
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SIPRNet	Secret internet Protocol Router Network
SO_2	Sulfur Dioxide
SOP	Standard Operating Procedures
SPL	Sound Pressure Level
SRI	Santa Rosa Island
SRI/OI	Santa Rosa Island/Okaloosa Island
SWIM	Surface Water Improvement and Management Act
T&E	Threatened and Endangered

LIST OF ACRONYMS AND ABBREVIATIONS CONT'D

TDC	Tourist Development Council
TECG/OPFOR	Tactical Exercise Control Group/Opposing Force
TMDLP	Total Maximum Daily Loads Program
TRI-DDS	Toxic Release Inventory-Data Delivery System
TS	Test Site
$\mu g/cm^3$	Micrograms per Cubic Centimeter
µg/dL	Micrograms per Deciliter
µg/L	Micrograms per Liter
$\mu g/m^3$	Micrograms per Cubic Meter
USC	United States Code
USDA	U.S. Department Of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish And Wildlife Service
USGS	U.S. Geological Survey
UXO	Unexploded Ordnance
VA	Veteran's Administration
VOC	Volatile Organic Compounds

1. PURPOSE AND NEED FOR THE PROPOSED ACTION

This document describes proposed Amphibious Ready Group (ARG)/Marine Expeditionary Unit (MEU) readiness training activities at Eglin Air Force Base (AFB), Florida. It also addresses anticipated environmental issues associated with the Proposed Action. This Environmental Assessment (EA) has been prepared by the U.S. Marine Corps pursuant to the National Environmental Policy Act (NEPA) [42 USC 4321-4370d] as implemented by the Council on Environmental Quality (CEQ) regulations [40 CFR 1500-1508]. The U.S. Marine Corps was the lead agency for preparation of this EA; the document was prepared in accordance with its NEPA implementing regulations found at MCO 5090.2A, Environmental Compliance and Protection Manual, Chapter 12. The U.S. Air Force was a cooperating agency in the preparation of the EA; the document was prepared in accordance with the CEQ regulations of 1978, and 32 CFR Part 989.

1.1 PURPOSE FOR THE ACTION

The purpose of the Proposed Action is to develop the capability for ARG/MEU training in/on a variety of landscapes prior to deployment and provide flexibility in training opportunities. The Proposed Action, which is to conduct ARG/MEU training at Eglin AFB (Figures 1-1, 1-2, and 1-3), provides the Marines ability to conduct sustained operations ashore after amphibious landings and accommodates large footprint weapons for realistic training scenarios.

1.2 NEED FOR THE ACTION

The Marine Corps is required by law to be fully combat capable per USC Title 10 (Subtitle C, Part I, Section 5063):

> The Marine Corps, within the Department of the Navy, shall be so organized as to include not less than three combat divisions and three air wings, and such other land combat, aviation, and other services as may be organic therein. The Marine Corps shall be organized, trained, and equipped to provide fleet marine forces of combined arms, together with the supporting air components, for service with the fleet in the seizure or defense of advance naval bases and for the conduct of such land operations as may be essential to the prosecution of a naval campaign.

Thus, the Marine Corps has adopted a rigorous training regime with specific tasks to assure continued readiness. These training requirements must be successfully executed prior to deployment of forces. The need exists to provide a variety of landscapes for training, provide opportunities for joint force training, and provide alternative training areas in case weather or logistical factors prevent the use of a particular training area.

Realistic training is key to maintaining readiness, and Eglin AFB, Air Force Materiel Command (AFMC), provides an additional realistic training location for the Marine Corps in order to maintain that readiness. Throughout our nation’s history, Marines have responded first to national and international incidents, crises, and when necessary, war. In fact, Marines were among the first to respond to the war on terrorism by sending forces to Afghanistan to dismantle the terrorism infrastructure established by the Taliban.

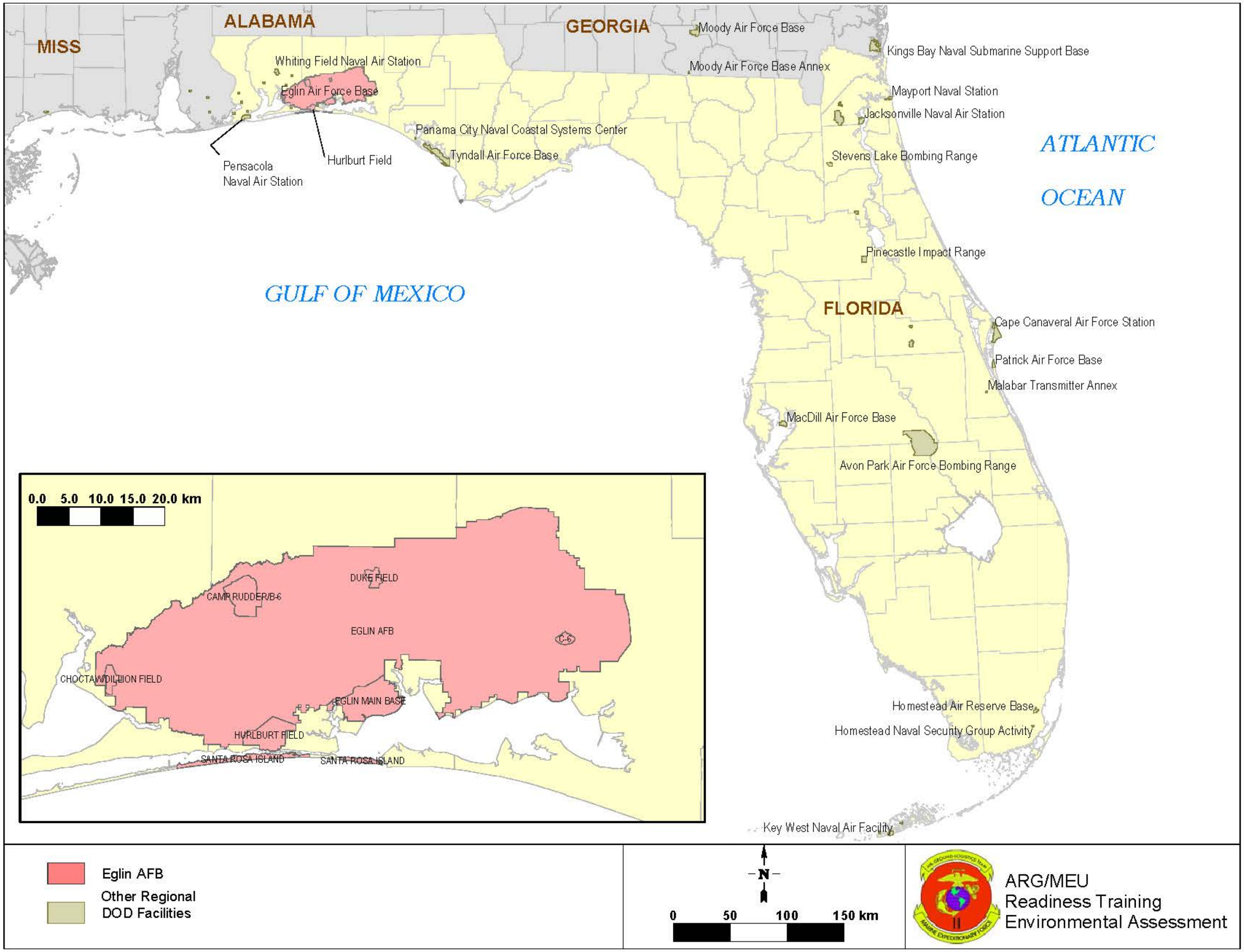

Figure 1-1. Location of Eglin AFB

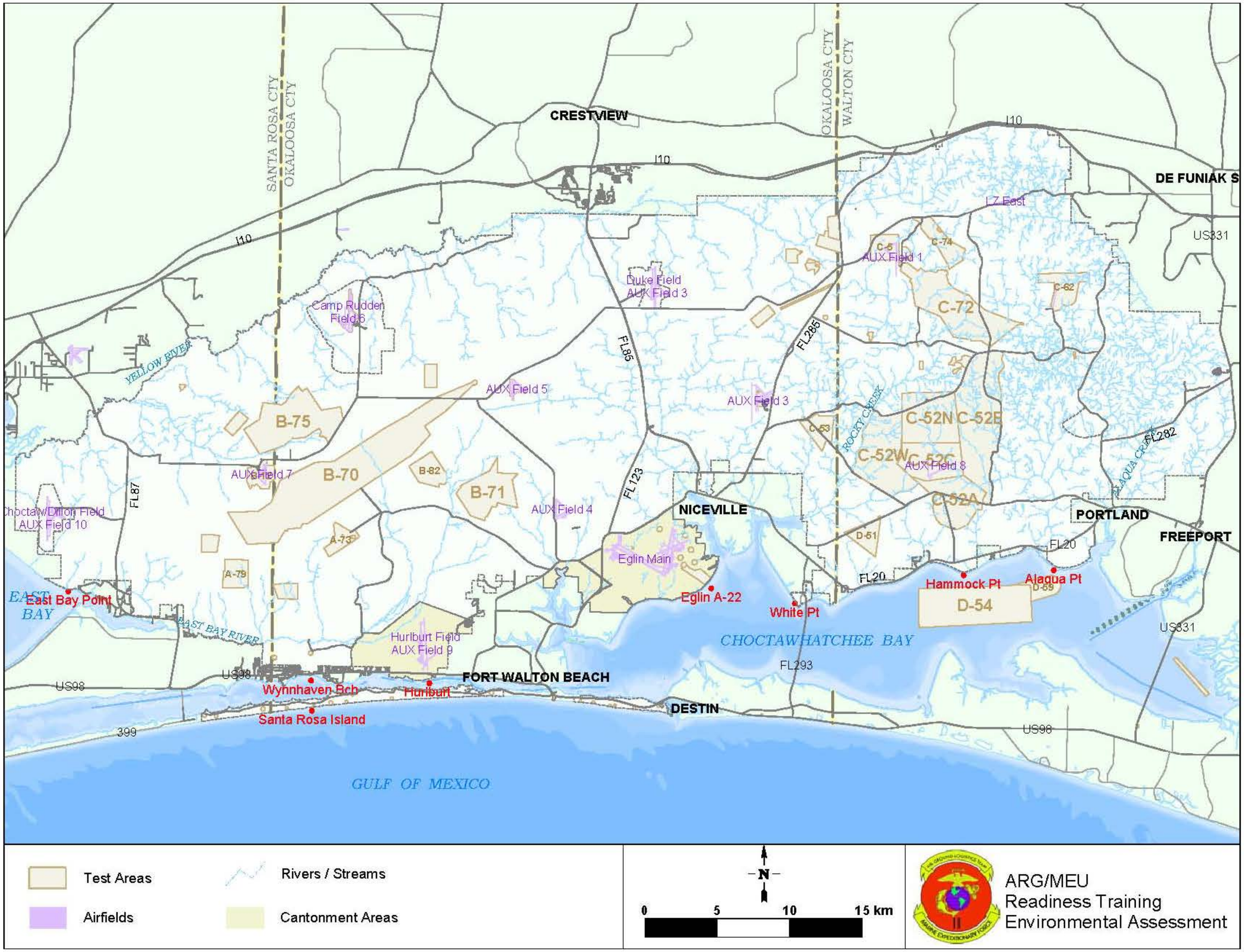

Figure 1-2. Eglin AFB Points of Interest

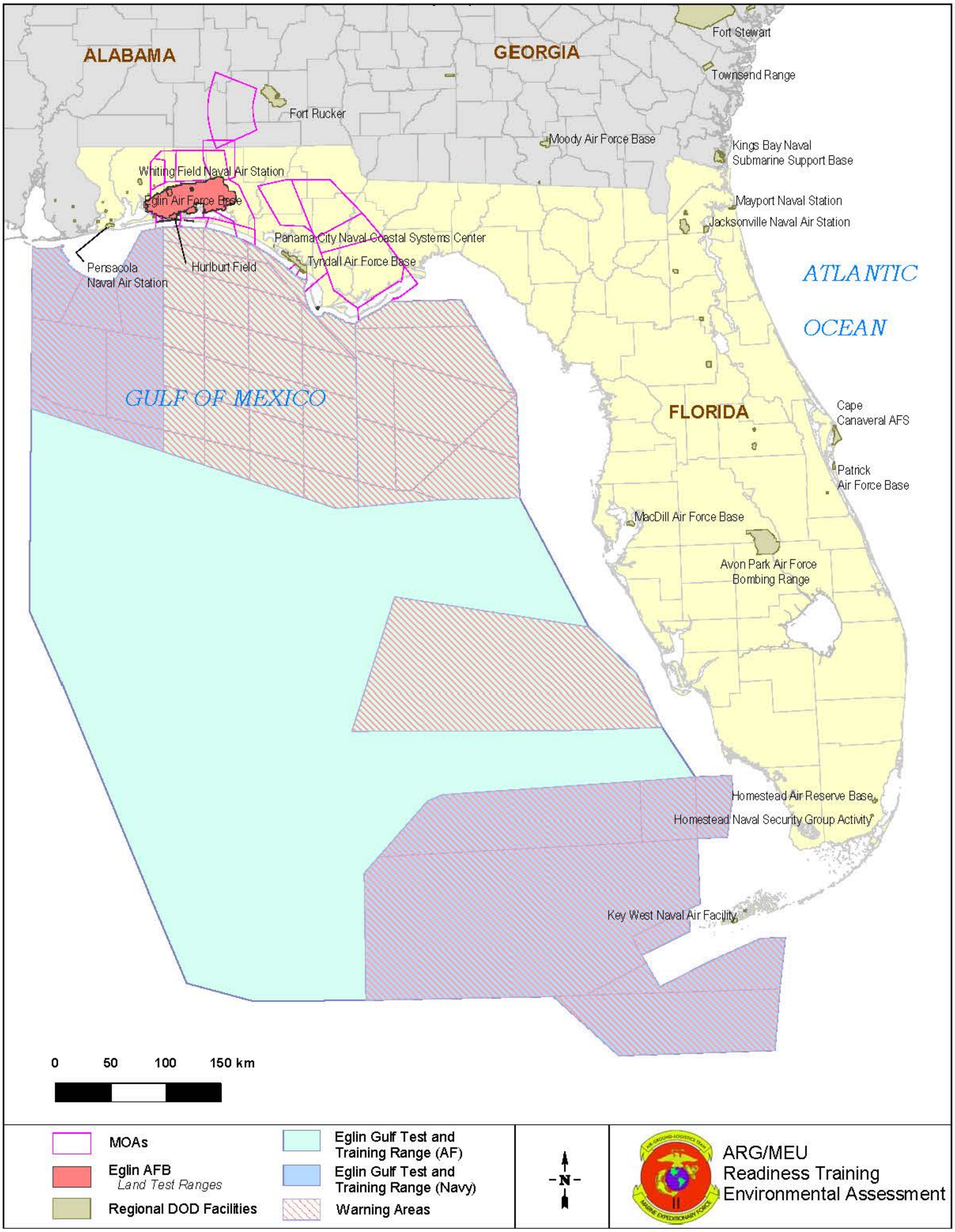

Figure 1-3. Eglin Over Land and Over Water Airspace

ARG/MEU forces are designed to be first responders with the capability to provide forward-deployed forces in support of national interests and policies. These forces are deployed on ships around the globe to respond quickly in times of need into areas of national interest. The primary mission of an ARG/MEU is to provide a forward-deployed, flexible, sea-based force capable of rapidly executing amphibious operations. ARG/MEUs have the ability to plan and commence execution of a mission within 6 hours of receiving an alert, warning, or order for deployment. Key to the success of an ARG/MEU as a fighting force is its ability to execute a full range of conventional operations, from amphibious assault to humanitarian assistance/disaster relief, across the entire spectrum of conflict. ARG/MEUs operate as an integral part of a joint and/or combined campaign and transition between operational environments on a moment's notice. Their ability to operate from ships provides unimpeded access to potential trouble spots around the world. An ARG/MEU is also able to withdraw rapidly at the conclusion of operations.

1.3 PROPOSED ACTION

The Proposed Action is to conduct ARG/MEU readiness training at Eglin AFB. The training is anticipated to occur twice per year with each training event having a total duration of 10 days, or less if only a portion of the activities is conducted. It is possible that the training could only occur once during some years and possibly not at all in others. This EA will assess the impacts associated with training occurring at a maximum level of twice per year, with the understanding that it may occur less. During a 10-day ARG/MEU training event, there are 17 proposed training-related activities:

- Insertion of Forward Command Element
- Insertion of Reconnaissance and Surveillance (R&S) Teams
- MEU Aviation Operations
- Helicopter Raids
- Rapid Ground Refueling
- Small Boat Raids
- Amphibious Landing Rehearsal
- Mechanized Raid (Wet)
- Mechanized Raid (Dry)
- ARG/MEU Landing
- Major Highway Crossing
- Supporting Arms Coordinating Exercise (SACEX)
- Live Fire and/or Maneuver
- Non-combatant Evacuation Operation
- Withdrawal
- Tactical Exercise Control Group/Opposing Force (TECG/OPFOR) Requirements
- Ship Operations

A detailed description of each of these activities is provided in Chapter 2. The detailed description outlines locations, duration, numbers of troops, types and numbers of vehicles and aircraft, along with associated activities. While the potential exists for all of these activities to occur, only a portion of them may be conducted within the 10-day period depending on operational requirements and other limiting factors (e.g., weather). For the purposes of this EA, the maximum-use scenario is evaluated and assesses the occurrence of all activities during an ARG/MEU readiness training event. By performing a maximum-use analysis, the full potential for impacts is assessed and thresholds are determined.

ARG/MEU Elements and Operational Criteria

The proposed activities listed above involve one or more of five basic elements: amphibious landings, MEU-level maneuvers ashore (hereafter referred to as ground movement), aviation operations, combined arms (hereafter referred to as munitions use), and pyrotechnics use. For each of these elements, there are operational criteria that help determine potential location alternatives for a given activity. Based on the operational criteria for each training element, potential locations on Eglin were chosen and are identified after each criterion. Chapter 2 provides further discussion with regard to alternatives.

1. **Amphibious landings:** This is the ship-to-shore movement of landing crafts (landing craft air cushion [LCAC] and landing craft utility [LCU]), amphibious assault vehicles, and small boats (Zodiacs). The landing crafts are used to transport all non-amphibious vehicles along with other equipment and troops. Based on the following operational criteria, potential locations were chosen and are identified after each criterion.

   Operational Criteria:

   - A land-water interface is needed.
   - LCUs have a 7-foot draft and require a water depth that will support this.
   - Amphibious assault vehicles (AAVs) have a limited traveling distance in the water of 7,000 meters, and it is preferable that the distance be about 3,500 meters (approximately 2 miles).
   - While LCACs can “fly” over smooth ground, they require a gradually sloping area free of obstacles to move from water to land. This type of shoreline can be created with minimal site improvements.
   - Zodiac boats can access almost any shoreline.

2. **Ground movement:** This is the movement of tracked and wheeled vehicles and troops on foot from landing sites to objective areas, from objective area to objective area, and from objective areas back to amphibious shipping (during withdrawal).

   Operational Criteria:

   - Need a non-asphalt surface for tracked vehicles (M1 tanks and AAVs will destroy asphalt if they drive on it).

- Need road infrastructure for wheeled vehicles to move troops and equipment.
- Need bridges of sufficient strength to support the weight of M1 tanks and AAVs. Evaluating capacity of current bridge infrastructure to support transport of tracked vehicles. Also, evaluating the need for bridge improvements.
- Need a tracked vehicle maneuver area.
- Need objective areas that have suitable targets or structures for raids.

3. **Aviation operations:** Delivery of troops and equipment from ship to shore via a variety of helicopters that would use designated landing and drop zones. Aviation operations also occur during live fire exercises and can include weapons delivery from F/A-18 and AV-8B aircraft.

   Operational Criteria:

   - Need available airspace and airspace control mechanisms to allow for air operations.
   - Need established airfield or landing strip to land KC-130s.
   - Need sufficient cleared area to land helicopters (would use established landing zones).

4. **Munitions use:** Live fire from ground-based troops and vehicles as well as air-delivery of larger munitions. This also includes the use of blank munitions and/or simunitions (i.e., paintballs) during raids.

   Operational Criteria:

   - Need areas that are authorized for use of all live munitions needed for MEU predeployment certification.
   - Need appropriate targets.
   - Need a corridor to fire from firing position to target area that meets safety criteria.

5. **Pyrotechnics use:** Raids on objective sites with opposing forces acting as resistance involves the use of pyrotechnics (smokes, simulators, and flares). Additionally, the AAVs may deploy smoke when traveling from ship to shore.

   Operational Criteria:

   - Need environmental constraints that would determine suitable use areas for pyrotechnics. From an operational perspective, these can be used anywhere but are typically used in conjunction with a raid on an objective. However, environmental constraints, such as wildfire danger and presence of sensitive species, are considered before deploying pyrotechnics. .
   - Need objective areas that have suitable targets or structures.

1.4 PRIOR SIMILAR ACTIVITIES AT EGLIN

Actions similar to the Proposed Action have previously been conducted at Eglin, and some still occur on a regular basis. For example, live fire operations involving various types of gunnery, bombs, and missiles are routinely conducted on Eglin's test areas. Fixed-wing and rotary aircraft fly thousands of sorties annually. Special operations units currently train on Santa Rosa Island, Wynnhaven Beach, Yellow River, and Choctawhatchee Bay, conducting amphibious assault and counterinsurgency training. Major amphibious exercises involving the Navy and/or Marines have been conducted on Santa Rosa Island including Joint Logistics Over the Shore (JLOTS) and Bold Eagle (U.S. Air Force, 1986; 1992).

1.5 POTENTIAL ENVIRONMENTAL ISSUES

This section describes the potential issues associated with the Proposed Action. Included in this narrative are potential issue areas and identification of training elements that may result in either beneficial or adverse impacts.

Transportation

Transportation issues include impacts to public and military roadways associated with the transportation of MEU assets during training. Areas of interest include the Gulf of Mexico, Santa Rosa Sound, public highway crossings, and public roads. Impacts from using all of these areas are analyzed individually and cumulatively. Potential impacts may result from amphibious vehicles accessing the Eglin reservation via Santa Rosa Sound, which would necessitate the closure of the Intracoastal Waterway for several periods of time during ingress and egress. U.S. HWY 98 would also be closed for several periods in order for tracked and wheeled vehicles to cross from Wynnhaven Beach and the Hurlburt GOS to the Eglin reservation. Additionally, wheeled vehicles may access the Eglin reservation using public highways and other roadways.

Socioeconomics

Socioeconomics addresses the potential for positive and negative impacts to the local economy, tourism, environmental justice, and restricted access.

Economy

Preliminary screening of this issue indicates that there would be positive socioeconomic impacts associated with the Proposed Action related to infrastructure improvements. The MEU arrives with all needed equipment and materials. Other than the possibility of up to 350 support (TECG/OPFOR) personnel utilizing local hotels and car rentals, there are no requirements to use local facilities or buy local merchandise. A slight increase in hotel use and car rentals over a 10-day period twice annually would provide a slight benefit to the local economy. All other Marines would be involved in training throughout the 10-day duration and would not be using any local businesses.

Tourism

Potential conflicts with tourism, primarily in conjunction with traffic interruptions is addressed.

Environmental Justice

A preliminary screening of census tract data surrounding the action areas for the Proposed Action has determined the presence of low-income or minority communities near the Eglin reservation. Environmental justice impacts from ARG/MEU training activities under the Proposed Action would occur if these communities were disproportionately impacted.

Restricted Access

Restricted access is defined as an increase or addition in restricted area and/or an increase or addition to the frequency of access restriction to public areas as a result of mission use. Restricted access issues associated with the Proposed Action include the potential for an increase in restricted access to recreational areas for the public resulting from MEU training activities.

Noise

MEU activities have the potential to increase the noise levels of Eglin and surrounding communities. Potential adverse impacts could be associated with increases in noise levels above established annoyance and health thresholds. Noise is assessed from several sources, with each activity analyzed separately. Ultimately, a cumulative assessment is performed to evaluate the potential impacts to humans and animals resulting from all noise sources. Potential noise impact drivers are associated with landing craft crossing Santa Rosa Sound and traversing through Wynnhaven Beach to the Eglin reservation, which would be in close proximity to residential housing; helicopters delivering troops and equipment to the Eglin reservation flying over residential areas; and the use of live munitions.

Safety

Public safety will be primarily protected through established procedures and restricted access to hazardous areas and activities. Safety issues associated with the Proposed Action are related to impacts to military personnel associated with the presence of unexploded ordnance (UXO) on the Eglin reservation and establishment of safety footprints associated with the use of live munitions and other training activities. The Proposed Action has inherent safety hazards associated with the impact and detonation of live munitions that would be used during live fire exercises. These are addressed in the EA. It should be noted that all munitions would be used on established live fire test areas and would be performed in accordance with Eglin’s range operating procedures and in coordination with Eglin’s safety office.

Wetlands

Federal agencies are required to analyze the impacts of their actions on wetlands. Wetlands are dominated by plants adapted to anaerobic substrate conditions imposed by saturation or inundation for more than 10 percent of the growing season. Wetlands have the potential to be impacted by amphibious vehicles, tracked vehicles, wheeled vehicles, and troop movement by foot. The primary concerns are at the beach landing sites with the potential for landing crafts and/or AAVs to damage wetlands. There is the potential to impact wetlands on Santa Rosa Island, at Wynnhaven Beach, and on other areas of the Eglin reservation, with vehicles gaining access to the reservation and/or objective areas.

Floodplains and Coastal Zone

Federal agencies are required to evaluate the effects of potential actions on floodplains. This includes floodplain delineation and alternatives for actions that occur in floodplains that would increase the risk of flood loss; impact human safety, health, and welfare; and affect the natural and beneficial values served by floodplains. Because activities associated with the Proposed Action may occur in floodplains, potential impacts from vehicle use and troop movements are analyzed.

Some components of the Proposed Action would take place within the Florida coastal zone as defined by Florida's Coastal Zone Management Act.

Water Quality

Federal agencies are required to evaluate the effects of potential actions on water quality. Water quality issues are associated with the potential for the Proposed Action to impact the quality of surface waters on Eglin and within the local community. Potential impacts may result from increased erosion due to tracked and wheeled vehicle use near and through surface water bodies, including bays, rivers, and Santa Rosa Sound, resulting in increased turbidity. No impacts to groundwater are anticipated from the Proposed Action.

Air Quality

Air resources pertains to the potential for actions to impact local air quality (based on air quality criteria as established by the Florida Department of Environmental Protection (FDEP)), potentially resulting in negative health effects to both humans and wildlife. Air emissions from a variety of sources have the potential to impact air quality; each source is assessed independently, but the sources are also analyzed cumulatively to assess overall impacts to air quality resulting from all MEU activities. The use of helicopters, aircraft, wheeled vehicles, tracked vehicles, amphibious vehicles, and landing craft would produce air emissions that are assessed for their impacts on air quality. Additionally, smokes and obscurants used for several activities are assessed for their potential to impact air quality.

Soils/Erosion

Issues associated with soils and erosion are related to the potential for the Proposed Action to either initiate or accelerate erosion on the Eglin reservation. Analysis of this issue area focuses on the potential for vehicles and troop activities to impact Eglin soils. Of special concern are tracked vehicles. Tanks would maneuver on ranges B-75, C-52N, and C-72. AAVs may potentially use any test range east of HWY 87 and west of HWY 85. Transit of AAVs to test areas and tanks to B-75 would involve travel across unimproved roads from Wynnhaven Beach. Tank maneuvers on B-75, C-52N, and C-72 would use existing tank trails. Wheeled vehicles and ground troop movement are also assessed.

Hazardous Materials (HAZMAT)/Solid Waste

Potential impacts are associated with actions requiring the use, storage, and/or transport of hazardous materials and the generation, storage, transport, and disposal of hazardous wastes

increase or decrease safety/health risks to military personnel and the public. Potential impacts may also be associated with inadvertent releases from ships and AAVs during amphibious landing activities, litter and refuse resulting from daily mission activities, the potential for disturbance of Installation Restoration Program (IRP) sites, the potential for fuel spills during rapid ground refueling activities, and the potential for UXO and chemical material contamination from the use of live munitions.

Sensitive Species

The Proposed Action has the potential to impact species protected under federal and state law. The primary issue is the potential impacts to nesting sea turtles and/or sea turtle hatchlings resulting from activities on Santa Rosa Island and in the nearshore waters of the Gulf of Mexico, including amphibious vehicle landings, landing craft landings, and island crossovers, as well as boats and troops accessing and maneuvering on the island. These same activities have the potential to impact nesting shore birds, beach mice, and the sensitive plants. Potential impacts to flatwoods salamanders from troop and vehicle movement are assessed. Live fire and maneuvers have the potential to impact the red-cockaded woodpecker. Some of the waterways proposed for MEU activities are known Gulf sturgeon habitats and are assessed for impacts.

Sensitive Habitats

Sensitive habitats refer to essential fish habitat, seagrass beds, and other conservation target aquatic and terrestrial communities (e.g., seepage slopes, steepheads). The Proposed Action has the potential to impact sensitive habitats.

Cultural Resources

Several of the landing craft and boat landing sites may affect archaeological sites. These areas would require site improvements to accommodate landing craft and staging areas for the vehicles that are unloaded from the landing craft. Site improvements include grading, tree removal, building gravel lots, and construction of boat ramps. Potential impacts from all of these activities are assessed individually and cumulatively.

1.6 CONSULTATION AND PERMITTING REQUIREMENTS

Endangered Species Act

Section 7 Consultations per the Endangered Species Act (ESA) have been completed with the U.S. Fish and Wildlife Service (USFWS) (formal) and National Marine Fisheries Service (NMFS) (informal) to address impacts to threatened and/or endangered species under their respective jurisdiction. Separate biological assessments were submitted to each agency. The USFWS submitted their Biological Opinion to Eglin AFB on April 15, 2003 (Appendix L), and the National Marine Fisheries Service submitted their Letter of Concurrence (Appendix M) on April 8, 2003. Receipt of these two documents completed the formal and informal consultation process for each agency, respectively.

National Historic Preservation Act

A formal Section 106 consultation with the State Historic Preservation Officer to address impacts to historic properties protected under the National Historic Preservation Act was completed on April 14, 2003 upon completion of the Memorandum of Agreement (Appendix K) between Eglin AFB and the SHPO.

Water Resources/Quality Permitting

In accordance with applicable federal and state laws and regulations, all required permits are being obtained.

Magnuson-Stevens Fishery Conservation and Management Act

Impacts to essential fish habitat and marine protected areas covered under this act were addressed via consultation with NMFS.

Transportation

Coordination with the Florida Department of Transportation (FDOT) is being pursued for appropriate traffic route closures. A request will be made to the Coast Guard to establish a temporary safety zone and issuance of a NOTMAR (notice to mariners) if closings of the Intracoastal Waterway are required.

Coastal Zone Management Act Consistency Determination

Some components of this action would take place within or otherwise may affect the jurisdictional concerns of the FDEP and therefore will require a consistency determination with respect to Florida's Coastal Zone Management Plan under the Federal Coastal Zone Management Act.

2. DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

NEPA requires that a range of alternatives that could accomplish the Proposed Action's purpose and need be considered as part of the environmental analysis (40 CFR 1508.9). For the Proposed Action, all locations at Eglin AFB that satisfy operational requirements were considered. The Proposed Action includes site improvements in order to optimize MEU access to the Eglin reservation. Alternative 1 reflects the use of similar training activities as the Proposed Action without conducting site improvements in order to optimize MEU access to the Eglin Reservation. A wide range of operational options on Eglin AFB were considered and evaluated within the Proposed Action and Alternative 1, and each potential location and the respective training activity taking place there were analyzed for potential environmental impacts.

2.1 PROPOSED ACTION (PREFERRED ALTERNATIVE)

The Proposed Action is to conduct ARG/MEU training twice annually at Eglin AFB; exercise duration would be 10 days and would involve the use of Eglin controlled airspace, land ranges, and water resources. The preferred alternative is to conduct the Proposed Action in a manner that would require construction and site enhancements.

ARG/MEU readiness training exercises involve a variety of activities. A description of each type of training activity is provided below, along with potential locations and duration. Based on operational criteria, all potential locations for conducting each activity were considered. The Marine Corps desires to have the potential to use any or all of the proposed locations for each activity. For some activities, such as helicopter raids, the potential locations are numerous; however, for other activities, such as finding landing sites for the LCU, there are only two potential locations. For this alternative, all of the locations that meet operational criteria are included as part of the Proposed Action. This provides the ARG and MEU commanders and their forces maximum flexibility and the most realistic training scenario possible during the training exercise. Maps of locations for each activity are included in Appendix A as Figures A-1 through A-14. The activities associated with ARG/MEU readiness training are detailed below.

Insertion of Forward Command Element: This event consists of 15 to 50 Marines coming ashore by any of the following means: helicopter, small boat, or landing craft or by civilian transport (assumes prior move from ship). These forces would move to a designated site designed to serve as a U.S. embassy or consulate. Once at the site, this group would interface with State Department role players, provide security for the site, and prepare evacuation sites. During the following 72 hours, role players acting as demonstrators establish a constant and escalating presence at the site.

Duration: 72 hours

Number of events: 1

Locations: Several helicopter landing zones (HLZs), Duke Field, Choctaw Field, or Eglin Main Base (Figure A-1)

Site/Infrastructure Improvements: None needed.

<u>Insertion of R&S Teams:</u> A mission undertaken either to obtain, by visual observation or other detection methods, information about the activities and resources of an actual or potential enemy or to secure data concerning the meteorological, hydrographical, or geographical characteristics of a particular area. Four- to five-man teams establish an observation point and stay ashore one to three days.

Duration: 4 to 5 hours per event under cover of darkness

Number of events: up to 25 events per 10-day training period

Delivery vehicles: helicopters, parachutes, or Zodiac boats

Locations: Santa Rosa Island, Yellow River, East Bay River, East Bay Point, and all established boat landing sites and helicopter landing zones (Figure A-2).

Site/Infrastructure Improvements: None needed.

<u>Ship Operations:</u> Transport of the MEU would be conducted by Naval ships from various locations throughout the United States to the Gulf of Mexico. ARG operations would take place within the Inner Transport Area. The Inner Transport Area would cover a 5 by 20 mile rectangular box approximately 1 to 6 nautical miles from the beach (Figure 2-1). During the 10-day exercise, ARG ships would normally remain in their assigned boxes at slow speed (5 to 10 knots) or anchor for short periods of time. Normal operations would include:

1) Launch/recovery of aircraft
2) Launch/recovery of LCAC, LCU, and AAVs

The ARG consists of three amphibious ships and would be augmented by two to three cruisers/destroyers. No ship-to-shore movement of ground forces is anticipated from cruisers and destroyers. All of the ARG shipping to include cruisers and destroyers could continuously maintain position within the Inner Transport Area for three to four days at a time. Ballasting of amphibious ships is required in order to launch amphibious vessels (LCAC, LCU, AAV). Ballasting operations involve the pumping of seawater into predetermined ballast tanks. This action results in the ship settling in the water to enable flooding of the welldeck. Prior to ballasting, the welldeck is inspected and cleaned to ensure no trash or other contaminants are inadvertently washed overboard when the welldeck is flooded. Once ballasted, amphibious vessels are launched.

Once amphibious vessels are recovered, deballasting operations are conducted to raise the ship back to its cruising profile. Deballasting involves the pumping of seawater from the ballast tanks back to sea, resulting in the ship rising in the water and removing all seawater from the welldeck. As the ballast tanks are used solely for seawater, there is no danger of contamination or inadvertent pumping of oil/waste products into the sea. Disposal of waste products (e.g., oily waste, plastics) would conform with federal regulations and policies. No wastes would be disposed in the water within the Inner Transport Area. There would be no impacts associated with air emissions because of the small number of Navy vessels, and due to their slow speed, no impacts associated with marine mammals or other endangered species would occur.

Anchoring evolutions would be conducted with caution and with respect to the seabed, underwater hazards, and anchoring restrictions imposed by the Coast Guard as published on navigational charts or via weekly NOTMARs.

ARG vessels would use passive sonar but not active sonar during ship operations.

Site/Infrastructure Improvements: None needed

MEU Aviation Operations: This is a summation of all fixed and rotary wing aircraft operations that would occur during a 10-day MEU training cycle. While there is a slight potential for all aircraft to be operating simultaneously, typically there would be seven aircraft operating in a single event.

Available aircraft (total): CH-46 (12), CH-53 (6), UH-1N (2), AH-1 (4), and AV-8B (6)

Timing: can occur anytime day or night

Number of events: would travel over populated areas up to six times per day

Locations: All military controlled airspace

Site/Infrastructure Improvements: None needed.

Helicopter Raid: This is the rapid deployment of a 180-man infantry company from ship to shore via helicopter transport with jet aircraft escort. The helicopters would fly on designated routes to designated landing zones on the Eglin main reservation. Marines would then exit the helicopters on foot and by four-wheeled vehicles to objectives where they would conduct blank firing and deploy pyrotechnics (smoke and signaling flares). Upon completion, the transport helicopters would land, and the Marines would reboard and return to amphibious shipping. Jets and helicopters would orbit during the entire mission.

Available aircraft (total): CH-46 (12), CH-53 (6), UH-1N (2), AH-1 (4), and AV-8B (6)

Timing: can occur anytime day or night

Duration: 6 to 8 hours

Number of events: up to four events during 10-day training period

Locations: Auxiliary Fields 1-3, 6-8, and 10 (Figure A-3) and all military-controlled airspace

Site/Infrastructure Improvements: None needed.

Rapid Ground Refueling: This is the use of KC-130s and/or CH-53s to refuel helicopters and vehicles. The KC-130s and CH-53s would land and deploy fuel hoses. Helicopters would land, taxi to the fueling stations, rapidly top off fuel tanks, then depart. Once all helicopters and vehicles are refueled, the fueling hoses would be retracted and the fueling aircrafts would depart.

Available aircraft (total): CH-46 (12), CH-53 (6), UH-1N (2), AH-1 (4), and KC-130 (2)

Timing: can occur anytime day or night

Number of events: up to four times during a 10-day training period

Locations: All military-controlled airspace and select auxiliary fields (Figure A-4). KC-130s would always be on established airfield; CH-53s can be at any established landing zone (LZ).

Site/Infrastructure Improvements: None needed.

Small Boat Raid: This is an amphibious operation involving swift incursion of an infantry company (up to 150 men) into an objective, followed by a planned withdrawal. The infantry company would move from amphibious shipping to designated beach landing sites on Santa Rosa Island and the main reservation via Zodiac boats and move on foot to objectives where they would conduct blank firing and deploy pyrotechnics (smoke and signaling flares). The Zodiac boats are pulled up onto the beach above the high water line and guarded by a few Marines throughout the training exercise. Upon completion, the Marines would return to the boats on foot and then travel back to amphibious shipping.

Duration: each event lasts 6 to 8 hours under cover of darkness

Number of events: up to four events in a 10-day training period

Delivery vehicles: up to 18 Zodiac boats carrying eight Marines per boat

Locations: Santa Rosa Island (SRI), Yellow River, East Bay River, Test Area (TA) D-84 (near TA D-84), Alaqua Point, and White Point (Figure A-5)

Site/Infrastructure Improvements: None needed.

Amphibious Landing Rehearsal: This is an exercise to coordinate the timing of the movement of vehicles, aircraft, and landing craft from ship to shore for planning the actual MEU landing. AAVs "swim" to shore, while other tracked and wheeled vehicles are transported via landing craft (LCAC or LCU). Helicopters touch down and may discharge equipment and forces and return to ship. The landing craft would discharge and return for subsequent loads. There would potentially be 5 LCAC landings, 13 AAV landings, and 1 LCU landing. LCACs will land just west of Test Site A-13B, while AAVs could land anywhere along the beach from TA A-10 to A-15. Equipment that will remain on SRI will be left at a designated staging area. Smokes are deployed for concealment purposes. Everything would be returned to ship or remain on Santa Rosa Island for future training exercises on the main reservation.

Duration: approximately 12 hours during daylight hours

Number of events: only one event per training cycle

Maximum number of aircraft (total): CH-53 (6) and CH-46 (12)

Maximum number of amphibious vehicles: AAVs (13), LCAC (5), and LCU (1)

Type and number of wheeled and tracked vehicles: Light Armored Vehicles (LAVs) (15), High Mobility Multipurpose Wheeled Vehicles (HMMWVs) (103), 7-ton trucks (35), M-198 towed howitzers (6), M1A1 tanks (4), earthmovers (2), bulldozers (2), and fuel trucks (2)

Locations: Santa Rosa Island, Hurlburt, Wynnhaven Beach, East Bay Point, TA D-84, Alaqua Point, and White Point (Figure A-6)

Site/Infrastructure Improvements:

Santa Rosa Island

Bury approximately 100 meters of power line along Santa Rosa Island Road near Test Site (TS) A-13B to allow for more LCAC crossing area.

Construct a concrete crossing area on Santa Rosa Island Road near TS A-13B to accommodate tracked vehicle crossings and loading onto trucks.

Installation of grip matting on the Sound side of SRI.

Wynnhaven Beach

Tree clearing, site grading to shoreline, and construction of a gravel staging area to allow for amphibious craft landings and offloading.

East Bay Point

Site grading to shoreline, tree clearing and construction of gravel staging area.

TA D-84

Site grading to shoreline to allow for amphibious craft landings and offloading.

Alaqua Point

Site grading to shoreline to allow for amphibious craft landings and offloading.

White Point

Minor tree clearing.

Hurlburt Field

None needed.

Mechanized Raid (Wet): This is an amphibious raid involving a combination of infantry, AAVs, LAVs, HMMWVs, and M1A1 tanks. This force would move from ship to shore via landing craft (LCAC or LCU) or AAV. Once ashore, the tanks, AAVs, and wheeled vehicles would maneuver to an objective, where infantry (up to 180 men) would discharge and conduct blank firing and employ pyrotechnic devices. After completion, Marines would return to amphibious shipping or remain on Eglin AFB for future training exercises.

Duration: approximately 8 to 10 hours anytime during day or night

Number of events: would occur up to two times in a 10-day training cycle

Maximum number of amphibious vehicles: AAVs (13), LCAC (5), and LCU (1)

Types and numbers of wheeled and tracked vehicles: LAVs (9), HMMWVs (7), M1A1 tanks (4)

Locations: Santa Rosa Island, Wynnhaven Beach, Hammock (TA D-84), Alaqua, White, and East Bay Points for landing, several test areas and auxiliary fields for objectives. If inland objective sites are used, all equipment would remain on land and would not return to amphibious shipping until the MEU withdrawal (Figure A-7)

Site/Infrastructure Improvements:

Santa Rosa Island

Bury approximately 300 feet of power line along Santa Rosa Island Road near TS A-13B to allow for more LCAC crossing area.

Construct a concrete pad on the road near TS A-13B to accommodate tracked vehicle crossings and loading onto trucks.

Wynnhaven Beach

Tree clearing, site grading to shoreline, and construction of a gravel staging area to allow for amphibious craft landings and offloading.

East Bay Point

Tree clearing, site grading to shoreline, and construction of a gravel staging area to allow for amphibious craft landings and offloading.

TA D-84

Site grading to shoreline to allow for amphibious craft landings and offloading.

Alaqua Point

Site grading to shoreline to allow for amphibious craft landings and offloading.

White Point

Minor tree clearing.

MEU Landing: This event involves moving all MEU assets from ship to the Eglin main reservation. Delivery would be accomplished using CH-46s and CH-53s, as well as LCACs and LCUs making multiple trips to shore. The AAVs would land and proceed to an objective area via a major highway crossing. Other tracked and wheeled vehicles would conduct a major highway crossing after disembarking from the landing craft. The helicopters and landing craft would land, discharge their forces and equipment, and return for subsequent loads. There would be 30 LCAC landings and 30 LCU landings. LCACs will land on SRI just west of TS A-13B, while AAVs could land anywhere along the beach from TA A-11 to A-15. Equipment that will remain on SRI will be left at a designated staging area. Total number of Marines is 2,000.

Duration: approximately 15 hours during daylight hours

Number of events: only one event per training cycle

Maximum number of aircraft (total): CH-53 (6) and CH-46 (12)

Maximum number of amphibious vehicles: AAVs (13), LCAC (5), and LCU (5)

Types and numbers of wheeled and tracked vehicles: LAVs (15), HMMWVs (103), 7-ton trucks (35), M-198 towed howitzers (6), M1A1 tanks (4), earthmovers (2), bulldozers (2), and fuel trucks (2). (A description and picture of each vehicle is included in Appendix G.)

Locations: Santa Rosa Island, Hurlburt, Wynnhaven Beach, TA D-84, Alaqua Point, White Point, Eglin Reservation Range Roads, and established landing zones (Figure A-8)

Site/Infrastructure Improvements:

<u>Santa Rosa Island</u>

Bury approximately 300 feet of power line along Santa Rosa Island Road near TS A-13B to allow for more LCAC crossing area.

Construct a concrete pad on the road near TS A-13B to accommodate tracked vehicle crossings and loading onto trucks

Installation of grip matting on the Sound side of SRI

<u>Wynnhaven Beach</u>

Tree clearing, site grading to shoreline, and construction of a gravel staging area to allow for amphibious craft landings and offloading.

<u>East Bay Point</u>

Tree clearing, site grading to shoreline, and construction of a gravel staging area to allow for amphibious craft landings and offloading.

<u>Hammock Point (TA D-84)</u>

Site grading to shoreline to allow for amphibious craft landings and offloading.

<u>Alaqua Point</u>

Site grading to shoreline to allow for amphibious craft landings and offloading.

<u>White Point</u>

Minor tree clearing.

<u>Hurlburt Field</u>

None needed.

<u>Road Improvements</u>

RR253	Replace 2 culverts.
	Construct maintenance turnout.
	Replace/improve Bridges #102 and 103 if engineering analysis determines necessary.
RR666	Increase curve radius.
	Improve intersection of RR253 and RR666.
	Replace culvert.
	Fill, level, and stabilize low points in road.
RR815	Improve intersection of RR815 and HWY 87.
	Fill, level, and stabilize low points in road.
	Replace culverts.
	Install culverts.
	Increase curve radius in road.
RR259	Concrete pavement near HWY 98 as staging area.
	Construct parallel tank trail beside asphalt portion of road.
	Replace culverts.
	Construct maintenance turnouts.
	Replace Bridge #93.
	Level grade to bridge approaches.
	Widen and improve road north of Bridge #93.
	Fill, level and stabilize low points in roadbed.
	Straighten "S" curve.
	Install concrete tank crossing at RR235.
	Widen road to 32 feet north of RR678
RR668	Replace or improve culvert.

<u>Major Highway Crossing:</u> In order to move forces to the Eglin main reservation vehicles would need to cross major public highways such as HWY 98, State Road (SR) 293 (White Point Road) and SR 20 (Figure A-9). Tracked and wheeled vehicles would cross HWY 98, and wheeled vehicles would cross HWY 20 and White Point Road. Because tracked vehicles destroy asphalt, it is necessary to place tires on the road for the tracked vehicles to drive over. The time required to lay down tires, conduct crossover, pull up tires, and sweep debris from roads is estimated at 30 minutes. Wheeled vehicles can cross quickly, with no preparatory or cleanup time required. Three waves of tracked vehicles would be needed for both ingress and egress over HWY 98, with each wave taking 30 minutes. These are maximum totals for all activities combined.

Site/Infrastructure Improvements: Any long-term improvements to major highways for facilitating training activities will be evaluated in future documentation.

<u>Mechanized Raid (Dry)</u>: This is very similar to the Mechanized Raid (Wet) but differs in that it would be initiated from a forward operating base already established on the Eglin main reservation rather than involving an amphibious assault from sea. The 180-man infantry raid force would move to an objective via tracked and wheeled vehicles where infantry would discharge and conduct blank firing and employ pyrotechnic devices. Upon completion of the mission, the Marines would return to the operating base.

Duration: approximately 8 to 10 hours anytime during day or night

Number of events: would occur up to two times in a 10-day training cycle

Types and numbers of wheeled and tracked vehicles: AAVs (13), LAVs (9), HMMWVs (7), M1A1 tanks (4)

Locations: Eglin Reservation Range Roads, B-75, B-12, B-70 (Figure A-7)

Site/Infrastructure Improvements: None needed

<u>SACEX:</u> For this training event, 250 ground-based Marines call in live fire to an established munitions range. Marines travel in wheeled vehicles or by foot. Spotters, forward observers, and forward air controllers would employ laser rangefinders/designators in the impact area. Major weapon systems would include 60- and 81-millimeter mortars, 155-millimeter howitzers, AH-1W and UH-1N gunships, and fixed-wing aircraft (AV-8B and F/A-18).

Available aircraft (total): UH-1N (2), AH-1 (4), F/A-18 (6), and AV-8B (6)

Duration: firing window from noon to midnight each day for a 72-hour period

Number of events: would only occur once during 10-day training period. The types and amounts of munitions involved are given in Appendix H.

Locations: C-52 (Figure A-10)

<u>Live Fire and/or Maneuver:</u> Eight hundred Marines would conduct static live fire and/or live fire with maneuver into established live fire areas. This force would operate on multiple ranges in groups of up to 135 men. This event includes fire and maneuver of the M1A1, AAV, LAV, HMMWV-mounted TOW missiles, heavy machine gun vehicles, small arms and tracers. Forces would sleep on their packs in the vicinity of firing ranges.

Duration: 72 hours

Number of events: once during 10-day training period

Types and numbers of wheeled and tracked vehicles: AAVs (13), LAVs (9), HMMWVs (7), M1A1 tanks (4), 7-ton trucks (20). The types and amounts of munitions involved are given in Appendix H.

Locations: B-75, B-5, B-12, A-77, C-72, B-70, B-71, A-78, A-79, B-7, B-82, B-76, C-62, C-53, C-5, C-52, B-6 (for wheeled vehicle maneuvering) (Figure A-11)

Site/Infrastructure Improvements: None needed.

Direct Action: This involves short-duration strikes and other small-scale offensive action to seize, destroy, capture, recover, or inflict damage on designated personnel or material. A group of approximately 75 Marines would be inserted to the target area by helicopter or small boat. The event would begin with a live fire, long-range sniper shot into a target building. An explosion designed to remove a door or create some other means of entry into the target building would immediately follow this. A close-quarters battle force would enter the building and move from room to room conducting live fire into prepositioned targets. All live fire would be into bullet traps. Once the entire building had been cleared of "enemy," the forces would withdraw from the site by helicopter or small boat.

Duration: 6 to 8 hours

Number of events: would only occur once during 10-day training period, usually at night

Possible locations: Santa Rosa Island (A-15) (Figure A-12)

Site/Infrastructure Improvements: None needed.

Noncombatant Evacuation Operation: This is an operation that is directed by the State Department whereby noncombatants are evacuated from foreign countries to safe havens or the United States when their lives are endangered by war, civil unrest, or natural disaster. Up to 300 Marines would come ashore by helicopter and/or landing craft and establish a processing and evacuation site(s), normally in the vicinity of the U.S. embassy/consulate compound. Over 24 to 36 hours, the Marines would collect role players from various locations and bring them to the processing/evacuation sites by wheeled tactical vehicles or civilian vehicles. They would then process the individuals for evacuation and evacuate them by helicopter and landing craft. In order to evacuate approximately 150 to 200 role players, multiple take-offs and landings of transport helicopters (CH-46 & CH-53), LCUs, and LCAC would occur during this training exercise. Established roads and landing zones would be used.

Duration: 24 to 36 hours

Number of events: once during 10-day training period

Maximum number of aircraft (total): CH-53 (6) and CH-46 (12)

Possible Locations: Eglin Main Base (A-22), Duke Field, Choctaw Field, B-12, Hurlburt GOS, B-6 (Figure A-13)

Site/Infrastructure Improvements: None needed.

<u>TECG/OPFOR Requirements:</u> This is a tactical exercise. The control group would arrive 1 week prior to the 10-day training event. This 350-man group is responsible for all aspects of the design and control of the exercise. Included in this group would be about 20 representatives from the State Department and other government agencies. Marines would act as role players and opposing forces. They would require a building with Non-classified Internet Protocol Router Network (NIPRNet) and Secret Internet Protocol Router Network (SIPRNet) capability, phone lines, electricity and plumbing. The preferred billeting for the Marines would be a barracks on base. Access to the local economy (e.g., hotels, rental cars, restaurants) may be required for administrative support.

Possible Location: C-1 for command, various auxiliary fields and test areas for opposing forces.

Site/Infrastructure Improvements: None needed.

<u>Withdrawal:</u> During a 10-day training cycle, this event would occur once, with forces withdrawing during daylight hours. Expected duration is 15 hours. This event is a reverse of the MEU Landing described above and would use the same locations as for the insertion. (See "MEU Landing" description for details.) (Figure A-14).

Duration: approximately 15 hours during daylight hours

Number of events: only one event per training cycle

Maximum number of aircraft (total): CH-53 (6) and CH-46 (12)

Maximum number of amphibious vehicles: AAVs (13), LCAC (5), and LCU (5)

Types and numbers of wheeled and tracked vehicles: LAVs (15), HMMWVs (103), 7-ton trucks (35), M-198 towed howitzers (6), M1A1 tanks (4), earthmovers (2), bulldozers (2), and fuel trucks (2). (A description and picture of each vehicle is included in Appendix G.)

Locations: Santa Rosa Island, Hurlburt, Wynnhaven Beach, East Bay Point, TA D-84, Alaqua Point, White Point, Eglin Reservation Range Roads, and established landing zones (Figure A-8)

Site/Infrastructure Improvements: Site improvements would be the same as those required for the MEU Landing exercise, as described below:

<u>Santa Rosa Island</u>

Bury approximately 300 feet of power line along Santa Rosa Island Road near TS A-13B to allow for more LCAC crossing area.

Construct a concrete pad on the road near TS A-13B to accommodate track vehicle crossings and loading onto trucks.

Install grip matting on the Sound side of SRI.

<u>Wynnhaven Beach</u>

Tree clearing, site grading to shoreline, and construction of a gravel staging area to allow for amphibious craft landings and offloading.

East Bay Point

Tree clearing, site grading to shoreline, and construction of a gravel staging area to allow for amphibious craft landings and offloading.

TA D-84

Site grading to shoreline to allow for amphibious craft landings and offloading.

Alaqua Point

Site grading to shoreline to allow for amphibious craft landings and offloading.

White Point

Minor tree clearing.

Hurlburt Field

None needed.

Range Roads

RR253	Replace 2 culverts.
	Construct maintenance turnout.
	Replace/improve Bridges #102 and 103 if engineering analysis determines necessary.
RR666	Increase curve radius.
	Improve intersection of RR253 and RR666.
	Replace culvert.
	Fill, level, and stabilize low points in road.
RR815	Improve intersection of RR815 and HWY 87.
	Fill, level, and stabilize low points in road.
	Replace culverts.
	Install culverts.
	Increase curve radius in road.

RR259	Concrete pavement near HWY 98 as staging area.
	Construct parallel tank trail beside asphalt portion of road.
	Replace culverts.
	Construct maintenance turnout.
	Replace Bridge #93.
	Level grade to bridge approaches.
	Widen and improve road north of Bridge #93.
	Fill, level and stabilize low points in roadbed.
	Straighten “S” curve.
	Install concrete tank crossing at RR235.
	Widen road to 32 feet north of RR678
RR668	Replace or improve culvert.

2.1.1 Proposed Action Summary

Table 2-1 below provides a summary of the locations, based on geographic name, auxiliary field number, and test area name, where activities associated with MEU training actions under the Proposed Action may occur. This includes transportation to and between objective sites. Figure 2-1 provides a graphical representation of MEU activity locations and transportation corridors.

Table 2-1. Proposed Action Training Activity Locations

Location	Training Activity																
	FCE	R&S	HR	RGR	SBR	ALR	MRW	MRD	MEU	RX	SACEX	LF/M	DA	NEO	WD	SO	TO
Geographic Locations																	
Gulf of Mexico	✔	✔			✔	✔	✔		✔				✔	✔	✔	✔	
Yellow River		✔			✔												
East Bay River		✔			✔												
Choctawhatchee Bay	✔	✔			✔		✔		✔					✔	✔		
Santa Rosa Sound	✔	✔			✔	✔	✔		✔					✔	✔		
Santa Rosa Island	✔	✔	✔		✔	✔	✔		✔				✔	✔	✔		
Wynnhaven Corridor	✔	✔				✔	✔		✔	✔					✔		
Hammock Point (TA D-84)	✔	✔			✔	✔	✔		✔	✔				✔	✔		
White Point	✔	✔			✔	✔	✔		✔	✔				✔	✔		
Alaqua Point										✔							
East Bay Point		✔			✔	✔			✔	✔				✔	✔		
Hurlburt Field						✔			✔	✔					✔		
Auxiliary Fields																	
1		✔	✔	✔			✔	✔	✔			✔			✔		✔
2		✔	✔	✔			✔	✔	✔			✔			✔		✔
3		✔	✔	✔			✔	✔	✔			✔			✔		✔
4		✔		✔			✔	✔	✔			✔			✔		✔
5		✔		✔			✔	✔	✔			✔			✔		✔
6		✔	✔	✔			✔	✔	✔			✔			✔		✔
7	✔	✔	✔	✔			✔	✔	✔			✔		✔	✔		✔
8		✔	✔	✔			✔	✔	✔			✔			✔		✔
10	✔	✔	✔	✔			✔	✔	✔			✔		✔	✔		✔
Landing Zone East		✔		✔			✔	✔	✔			✔			✔		✔
Test Areas																	
A-11		✔															
A-11A		✔					✔	✔	✔						✔		✔
A-13B		✔					✔	✔	✔						✔		✔
A-15		✔					✔	✔	✔				✔		✔		
A-22	✔													✔			✔
A-77		✔					✔	✔	✔			✔			✔		✔
A-78		✔					✔	✔	✔			✔			✔		✔
A-79		✔					✔	✔	✔			✔			✔		✔
B-5		✔					✔	✔	✔			✔			✔		✔
B-12		✔					✔	✔	✔			✔			✔		✔
B-70		✔					✔	✔	✔			✔			✔		✔
B-71		✔					✔	✔	✔			✔			✔		✔
B-82		✔					✔	✔	✔			✔			✔		✔
B-75		✔					✔	✔	✔			✔			✔		✔
C-1																	✔
C-52		✔					✔	✔	✔		✔	✔			✔		✔
C-53		✔					✔	✔	✔			✔			✔		✔
C-62		✔					✔	✔	✔			✔			✔		✔
C-72		✔					✔	✔	✔			✔			✔		✔
Other																	
Several LZ/DZs	✔	✔	✔	✔					✔		✔			✔	✔		✔
Military Airspace	✔		✔						✔		✔	✔		✔	✔		✔
Eglin Range Roads	✔	✔					✔	✔	✔	✔		✔		✔	✔		✔
US 98, SR 20										✔							
Interstitial Areas		✔	✔		✔		✔	✔	✔			✔		✔	✔		✔

FCE = Insertion of Forward Command Element
R&S = Insertion of Reconnaissance & Insertion Team
HR = Helicopter Raid
RGR = Rapid Ground Refueling
SBR = Small Boat Raid
ALR = Amphibious Landing Rehearsal
MRW = Mechanized Raid Wet
MRD = Mechanized Raid Dry
MEU = ARG/MEU Landing
RX = Major Highway Crossing
LF/M = Live Fire and/or Maneuver
DA = Direct Action
NEO = Non-Combatant Evacuation Operation
WD = Withdrawal
TO = TECG/OPFOR
SO = Ship Operations
✔ = Location of MEU event-related activities (including transportation corridors between objective sites))

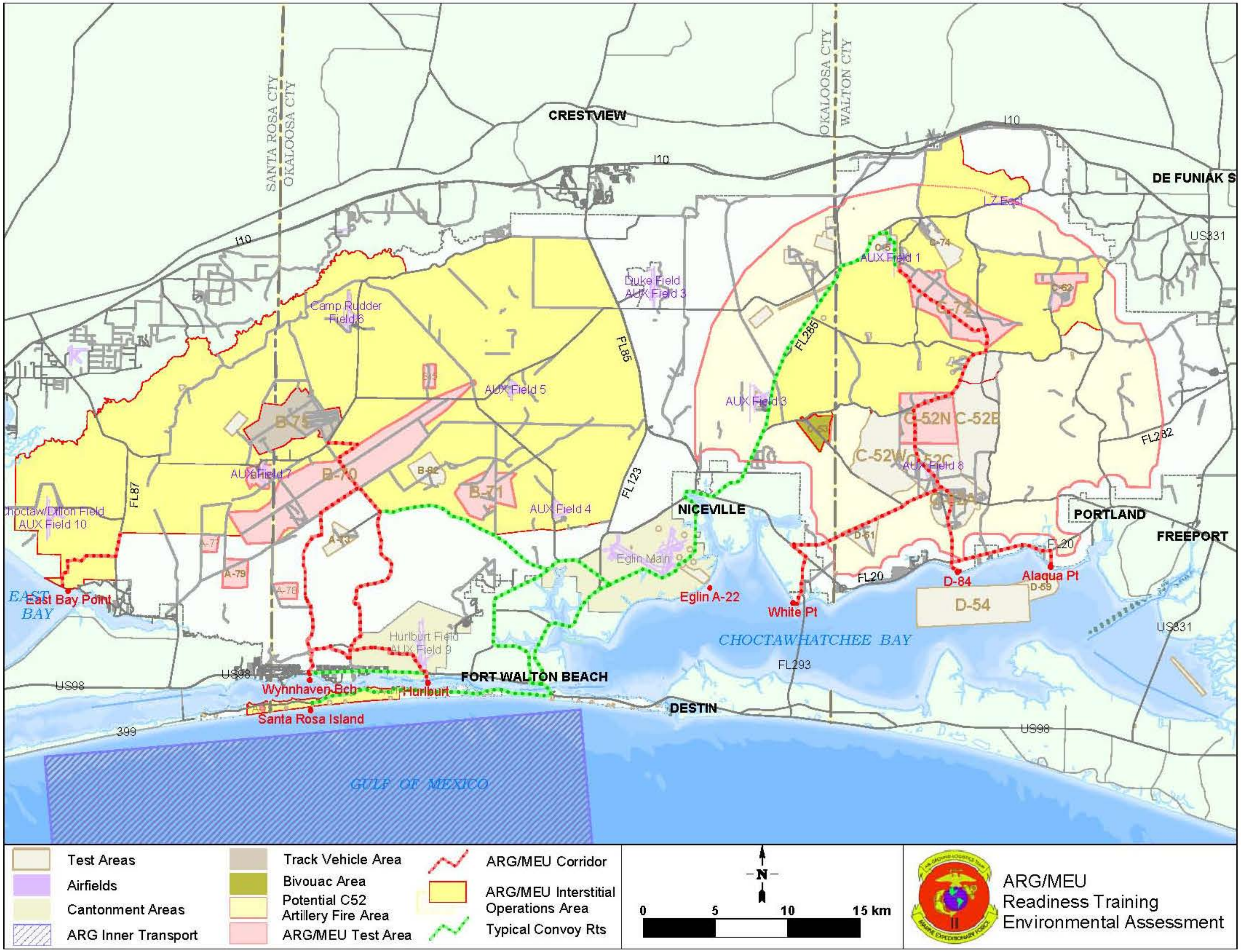

Figure 2-1. MEU Activity Locations And Transportation Corridors

Table 2-2 provides a breakdown of the individual elements associated with specific training activities under the Proposed Action. This breakdown is based on the various elements associated with specific mission activities such as amphibious landings (from ship to mean high water line), ground movements (troop and vehicle use above mean high water line), aviation operations, use of munitions, and use of pyrotechnics. The impacts associated with these activities will be the focus of this assessment.

Based on the identification of activities associated with specific missions in Table 2-2, Table 2-3 correlates these activities to specific issues and provides a summary description of the potential impacts within these issue areas.

Table 2-4 applies the training activity-related elements identified in Table 2-2 and the issues associated with those elements identified in Table 2-3 and correlates them to the issues associated with the overall training activity as described in Section 1.5. The association identified in Table 2-4 is a reflection of the potential cumulative impacts as related to a complete training activity involving all of its components.

Table 2-2. Mission-Related Elements

Mission Activity	Element															
	Amphibious Landing				*Ground Movement*			*Aviation Operations*		*Munitions Use*				*Pyrotechnics*		
	LCAC	LCU	AAV	ZODIAC	Troops	Tracked Vehicle	Wheeled Vehicle	Helos	Planes	Blanks	Small Arms	Large Guns	Bombs/Mortars /Rockets/Lasers	Flares	Smokes	Simulators
Insertion of Forward Command Element	✔	✔					✔	✔								
Insertion of R&S Teams	✔			✔	✔			✔		✔				✔	✔	✔
Helicopter Raid					✔			✔	✔	✔				✔	✔	✔
Rapid Ground Refueling								✔	✔							
Small Boat Raid	✔			✔	✔			✔	✔	✔				✔	✔	✔
Amphibious Landing Rehearsal	✔	✔	✔		✔	✔	✔	✔	✔						✔	
Mechanized Raid Wet	✔	✔	✔		✔	✔	✔	✔	✔	✔				✔	✔	✔
Mechanized Raid Dry					✔	✔	✔	✔	✔	✔				✔	✔	✔
MEU Landing	✔	✔	✔		✔	✔	✔	✔	✔	✔					✔	✔
Major Highway Crossing			✔		✔	✔	✔									
SACEX					✔	✔	✔	✔	✔			✔	✔			
Live Fire and/or Maneuver					✔	✔	✔	✔	✔		✔	✔	✔	✔	✔	
Direct Action				✔	✔			✔			✔			✔	✔	✔
Non-Combatant Evacuation Operation		✔			✔		✔	✔		✔				✔	✔	✔
Withdrawal	✔	✔	✔		✔	✔	✔	✔	✔							
TECG/ OPFOR					✔		✔			✔						✔
Ship Operations	✔	✔	✔	✔				✔	✔							

Table 2-3. Mission Elements – Issue Relationship

<table>
<tr><th rowspan="2">Issue</th><th colspan="5">Element</th></tr>
<tr><th>Amphibious Landing</th><th>Ground Movement</th><th>Aviation Operations</th><th>Munitions Use</th><th>Pyrotechnics</th></tr>
<tr><td>Transportation</td><td>Impacts to Intracoastal Waterway, Choctawhatchee Bay, Destin Pass, East Bay</td><td>Public highway crossings resulting in temporary closures.</td><td colspan="3">None identified.</td></tr>
<tr><td>Socioeconomic</td><td colspan="5"></td></tr>
<tr><td>Economy</td><td colspan="5">Infrastructure and site improvements would have a slight beneficial impact to the economy.</td></tr>
<tr><td>Restricted Access</td><td>NOTMAR requirements and standoff distances in Gulf, Santa Rosa Sound, and bays.</td><td>Potential for recreational area closures on Eglin Mainland Reservation during troop and equipment movements.</td><td>None identified.</td><td>Potential for recreational area closures on Eglin Mainland Reservation during munitions use.</td><td>None identified.</td></tr>
<tr><td>Environmental Justice</td><td colspan="5">None identified.</td></tr>
<tr><td>Noise</td><td>Noise from LCACs, LCUs, AAVs to public.</td><td>Noise from wheeled and tracked vehicles.</td><td>Noise impacts associated with fixed and rotary wing aircraft operations.</td><td>Noise generated from use of blanks, small arms, large guns, and bombs/mortars.</td><td>None identified.</td></tr>
<tr><td>Safety</td><td>None identified.</td><td>UXO clearances prior to digging.</td><td>Helicopter transport of external loads could be a safety issue</td><td>Identification of appropriate safety requirements for use of munitions and lasers (e.g., safety footprints)</td><td>Wildfire potential from use of flares.</td></tr>
<tr><td>Wetlands</td><td>Disturbance from amphibious landing craft.</td><td>Potential impacts from wheeled and tracked vehicles and ground troop movements.</td><td colspan="3" rowspan="3">None identified.</td></tr>
<tr><td>Floodplains</td><td>Disturbance from amphibious landing craft.</td><td>Potential impacts from wheeled and tracked vehicles and ground troop movements.</td></tr>
<tr><td>Water Quality</td><td>Disturbance to substrates in Santa Rosa Sound, bays, and rivers. Bilge release and ballast/deballast.</td><td>Potential impacts associated with stream and river crossings.</td></tr>
<tr><td>Air Quality</td><td>Emissions from LCACs, LCUS, and AAVs.</td><td>Emissions from wheeled and tracked vehicles.</td><td>Air emissions associated with fixed and rotary wing aircraft operations.</td><td>Air emissions associated with munitions use.</td><td>Air emissions associated with pyrotechnics use.</td></tr>
<tr><td>Soils/ Erosion</td><td>Erosion potentials from amphibious landing craft.</td><td>Potential impacts from wheeled and tracked vehicles and ground troop movements.</td><td>None identified.</td><td>Soil concentrations associated with chemical constituents from munitions use.</td><td rowspan="2">None identified.</td></tr>
<tr><td>HAZMAT/ Solid Waste</td><td>Potential impacts associated with inadvertent releases.</td><td>Litter and refuse resulting from daily mission activities.</td><td>Potential fuel spills during rapid ground refueling.</td><td>UXO potential and chemical material debris from munitions use.</td></tr>
<tr><td>Sensitive Species</td><td>Potential impacts to sea turtles, Gulf sturgeon, shorebirds, beach mice, and Cladonia perforata.</td><td>Potential impacts to flatwoods salamander, red-cockaded woodpecker, Okaloosa darter.</td><td rowspan="3">None identified.</td><td>Noise impacts to red-cockaded woodpeckers from munitions use.</td><td>Potential impacts to red-cockaded woodpeckers from use of obscurants.</td></tr>
<tr><td>Sensitive Habitats</td><td>Potential impacts to essential fish habitat, seagrass beds, and dune habitat.</td><td>Potential impacts to Tier I habitats, seepage slopes, and significant botanical sites.</td><td rowspan="2">None identified.</td><td>Wildfire potential from use of flares.</td></tr>
<tr><td>Cultural Resources</td><td>Potential impacts to cultural sites located along shorelines.</td><td>Potential impacts to mainland reservation cultural resource sites from digging.</td><td>None identified.</td></tr>
</table>

Table 2-4. Training Activity – Issue Relationship

Issue	Training Activity																
	FCE	R&S	HR	RGR	SBR	ALR	MRW	MRD	MEU	RX	SACEX	LF/M	DA	NEO	WD	TO	SO
Trans.						✔	✔		✔	✔					✔		
Socioecon.																	
Noise	✔		✔	✔	✔	✔	✔	✔	✔		✔	✔	✔	✔	✔		
Safety											✔	✔	✔			✔	✔
Wetlands	✔	✔			✔	✔	✔		✔				✔		✔	✔	
Floodplains	✔	✔			✔	✔	✔		✔				✔		✔	✔	
Water Quality	✔	✔		✔	✔	✔	✔		✔						✔		✔
Air Quality	✔		✔			✔			✔		✔	✔		✔	✔		
Soils/ Erosion		✔	✔		✔	✔	✔	✔	✔			✔		✔	✔	✔	
HAZMAT/ Solid Waste				✔					✔		✔	✔	✔				
Restricted Access						✔	✔		✔		✔	✔	✔		✔	✔	
Sensitive Species	✔	✔			✔	✔	✔	✔	✔		✔	✔	✔		✔	✔	
Sensitive Habitats	✔	✔			✔	✔	✔	✔	✔		✔	✔	✔		✔	✔	
Cultural Resources	✔	✔			✔	✔	✔	✔	✔		✔	✔	✔		✔	✔	
Environ. Justice																	

FCE = Insertion of Forward Command Element
R&S = Insertion of Reconnaissance & Insertion Team
HR = Helicopter Raid
RGR = Rapid Ground Refueling
SBR = Small Boat Raid
ALR = Amphibious Landing Rehearsal
MRW = Mechanized Raid Wet
MRD = Mechanized Raid Dry
MEU = MEU Landing
RX = Major Highway Crossing
LF/M = Live Fire and/or Maneuver
DA = Direct Action
NEO = Non-Combatant Evacuation Operation
WD = Withdrawal
TO = TECG/OPFOR
SO = Ship Operations

2.2 ALTERNATIVE 1 (ARG/MEU READINESS TRAINING WITH MINIMAL SITE/ INFRASTRUCTURE IMPROVEMENTS)

Alternative 1 involves all the training activities as described under the Proposed Action, with the exception of the listed site/infrastructure improvements. Without improvements, the beach landing sites at Alaqua, East Bay, and Hammock (TA D-84) Points as well as Wynnhaven Beach, cannot accommodate LCAC landings and offloadings or AAV landings. Thus, these beach landing sites could not be used during the MEU landing or withdrawal unless the site improvements were implemented (see Table 2-5). This alternative would allow the conduct of most of the training activities but would require administrative access to Eglin's mainland reservation training areas. Administrative access refers mainly to the use of trucks and lowboys to haul tracked vehicles to the training areas. Additionally, without the necessary site improvements, some of the preferred alternative transportation routes for tracked vehicles could not accommodate the weight or width of the vehicles. Therefore, the major difference between this alternative and the preferred alternative is how the MEU will access the training area on the Eglin main reservation.

Table 2-5. Reduced ARG/MEU Training Implementation Changes for Alternative 1

Activity	Implementation Change
Insertion of Forward Command Element	No difference from Proposed Action.
Insertion of R&S Teams	
Helicopter Raid	
Rapid Ground Refueling	
Small Boat Raid	
Amphibious Landing Rehearsal	Wynnhaven Beach, Hammock (TA D-84), Alaqua Point, and East Bay Point would not be utilized. All activities would occur on Santa Rosa Island, Hurlburt Field, and White Point.
Mechanized Raid Wet	Santa Rosa Island would be the only location utilized.
Mechanized Raid Dry	No difference from Proposed Action
MEU Landing	No amphibious landings at Wynnhaven Beach, East Bay, Hammock (TA D-84), and Alaqua Points. All wheeled and tracked vehicles would be offloaded at Hurlburt and/or SRI and would be trucked to the Eglin Mainland Reservation along public roads and Eglin range roads. The concrete crossing area and the buried power line on SRI and road improvements on the Eglin reservation as described under the Proposed Action, with the exception of RR 259 and 815, would still apply.
Major Highway Crossing	There would be no tracked vehicle crossings at U.S. HWY 98. All tracked vehicles would be convoyed on trucks. Road closures would still be required for convoy and wheeled vehicle access to public highways, but for a shorter duration.
SACEX	No difference from Proposed Action.
Live Fire and/or Maneuver	
Direct Action	
Non-Combatant Evacuation Operation	
Withdrawal	Movement from shore to ship would occur from Hurlburt Field, Santa Rosa Island, and White Point. All tracked vehicles would be transported from objective sites on Eglin to loading areas via public roads and Eglin range roads. The concrete crossing area and the buried power line on SRI and road improvements on the Eglin reservation as described under the Proposed Action, with the exception of RR 259 and 815, would still apply.
TECG/OPFOR	No difference from Proposed Action.
Ship Operations	

Implementation of this alternative would allow unhindered training once assets were located to Eglin Military Complex training areas. However, this alternative would not provide maximum training flexibility for accessing the reservation through amphibious landing exercises. The value of the readiness training would be decreased because this alternative would not allow for the training of ship to shore movements and access, a valuable portion of the readiness training. Table 2-6 is a comparison of the infrastructure improvements that would be implemented for the Proposed Action versus those that would be implemented under Alternative 1.

2.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, the required training would not be performed at Eglin AFB. This would not provide the flexibility needed to maintain readiness, nor would it provide the Navy and Marine Corps with a new, unique training environment. The No-Action Alternative also represents the existing condition at Eglin AFB from which alternatives for conducting ARG/MEU training at Eglin are evaluated.

Table 2-6. Comparison of the Infrastructure Improvements for the Proposed Action versus Alternative 1

Location	Description of Proposed Infrastructure Change and/or Improvement to Beach Landing Sites	
	Proposed Action	**Alternative 1**
Santa Rosa Island	Bury 100 yards of power line in A-13B corridor.	Same as Proposed Action.
	Construct concrete crossing/loading area on SRI road at A-13B.	Same as Proposed Action.
	Potentially install grip matting on Sound-side of SRI for AAV access.	No grip matting installation with this Alternative.
Wynnhaven Beach	Clear, grub, and grade the site for beach landings of LCACs and AAVs.	No site improvements at Wynnhaven Beach would be implemented for this Alternative. As such, it would not be used as an ingress or egress point during MEU landing or withdrawal.
	Install grip matting on shoreline for AAV landing.	
	Stream crossings with box culverts.	
	Construct concrete hard stands as staging/loading areas.	
	Develop road from staging area to HWY 98.	
Hurlburt GOS	No site improvements would be implemented for this alternative.	No site improvements would be implemented for this alternative.
White Point	Selective hand clearing of trees.	No site improvements would be implemented for this alternative and it would be used in its current configuration.
	Grade and stabilize beach landing area.	
Alaqua Point	Grade and stabilize beach landing area.	No site improvements at Alaqua Point would be implemented for this Alternative. As such, it would not be used as an ingress or egress point during MEU landing or withdrawal.
	Construct concrete retaining walls if needed.	
	Install a box culvert for stream crossing.	
	Demolition of former wooden retaining wall that is now below the water line.	
Hammock Point (D-84)	Demolition of timber bulkhead.	No site improvements at Hammock Point would be implemented for this Alternative. As such, it would not be used as an ingress or egress point during MEU landing or withdrawal.
	Selective clearing of trees.	
	Grade, stabilize beach landing areas.	
	Construct concrete retaining walls.	
	Improve road between SR20 and gate.	
East Bay Point	Clear, grub, and grade.	No site improvements at East Bay Point would be implemented for this Alternative. As such, it would not be used as an ingress or egress point during MEU landing or withdrawal.
	Grade and stabilize beach landing area.	
	Stabilize staging area.	
	Construct retaining walls.	

Table 2-6. Comparison of the Infrastructure Improvements for the Proposed Action versus Alternative 1 Cont'd

Eglin Range Road	Description of Site Improvements for Eglin Range Roads	
	Proposed Action	**Alternative 1**
RR253	Replace 2 culverts.	No road improvements would be implemented under this alternative. Access to Eglin Test Areas and objective areas would be accomplished using Eglin Range Roads in their current configuration. Tracked vehicles would be transported on flatbed trucks to training areas. Wheeled vehicles would travel on public highways and Eglin range roads to their training areas in convoys.
	Construct maintenance turnout.	
	Replace/improve Bridges #102 and 103 if engineering analysis determines necessary.	
RR259	Concrete pavement near HWY 98 as staging area.	
	Construct parallel tank trail beside asphalt portion of road.	
	Replace culverts.	
	Construct maintenance turnouts.	
	Replace Bridge #93.	
	Level grade to bridge approaches.	
	Widen and improve road north of Bridge #93.	
	Fill, level and stabilize low points in roadbed.	
	Straighten "S" curve.	
	Install concrete tank crossing at RR235.	
RR666	Increase curve radius.	
	Improve intersection of RR253 and RR66.	
	Replace culvert.	
	Fill, level, and stabilize low points in road.	
RR668	Replace or improve culvert.	
RR815	Improve intersection of RR815 and HWY 87.	
	Fill, level, and stabilize low points in road.	
	Replace culverts.	
	Install culverts.	
	Increase curve radius in road.	

3. AFFECTED ENVIRONMENT

3.1 TRANSPORTATION

Regional Transportation Network

The primary regional transportation network surrounding Eglin Air Force Base (Base) and east of the project area is shown in Figure A-15 in Appendix A. The region includes: Interstate 10 to the north; State Highway 85, which bisects the Base; Highway 285, which passes through the eastern half of the Base; U.S. Highway 331 located at the eastern end of the Base; Highway 123; and U.S. Highway 98 (US 98), which is also known as State Route 30.

On the western side of the reservation, the primary roadways include Highway 87 to the north, Highway 399 along the shoreline, and US 98. US 98 is the primary east-west travel corridor along the coast, connecting many coastal communities between Pensacola and Panama City. Alternative routes parallel to the coast are limited to I-10, which is the main east-west route across northern Florida. Highway 20 on the east side of the reservation provides another route for intercity travel.

Local Transportation Network

US 98 is the primary east-west route for all local traffic east of Highways 87 and 399 on the west side of the reservation and Highway 189 on the east side. Alternative routes are not available due to the lack of access and roads through the Base, except for Highway 85, which bisects the reservation.

Traffic Volumes and Levels of Service

Table 3-1 presents traffic volumes and Levels of Service (LOS) for US 98 in the vicinity of the Proposed Action locations. LOS is described by a letter designation of either A, B, C, D, E or F. An LOS "A" represents conditions with minimal delay, while a LOS "F" represents conditions with much longer delays. Typically, a LOS of "D" or better is considered to be acceptable operational conditions. LOS is also defined by the ratio of actual peak hour traffic volumes over design capacity volumes. Table 3-2 shows traffic LOS as a function of Volume to Capacity Ratios.

Table 3-1. US 98 Traffic Volumes and Levels of Service

Road Segment Representing (Actual) Direction		2001 Average Annual Daily Traffic Volumes	2001 Peak Hour Traffic Volumes		2001 Peak Hour LOS	
			A.M.	**P.M.**	**A.M.**	**P.M.**
Just east of Highways 87 and 399 (Milepost 20.15 - 300' east of SR 399 [toll bridge] in Navarre)	*Eastbound*	17,000	1,589	1,205	NA	NA
	Westbound	16,500	1,013	1,820	NA	NA
At Project Site east of Wynnhaven Beach (Milepost 5.75 - west of Hurlburt Field Main Entrance)	*Eastbound*	21,000	2,414	1,158	D	B
	Westbound	20,500	647	2,141	B	C
At entrance to White Point Road from White Point	*Northbound*	7,500	Data Unavail.	Data Unavail.	E	E
	Southbound	7,300	Data Unavail.	Data Unavail.	E	E
Just west of Highway 189 (Milepost 12.20 - just east of Brooks Bridge)	*Eastbound*	25,028	953	999	C	C
	Westbound	25,358	709	1,202	B	C

Source: Forester, Tracy, Genesis Group, 2003; Florida Department of Transportation, 2001

Table 3-2. Level of Service as a Function of Volume to Capacity Ratios

Level of Service	Range of Actual Volume/Design Capacity Ratios
A	0 – 0.60
B	0.61 – 0.70
C	0.71 – 0.80
D	0.81 – 0.90
E	0.91 – 1.00
F	> 1.01

Source: Transportation Research Board, 2000 (Highway Capacity Manual)

Public Travel Patterns: Origins and Destinations

Public travel patterns on US 98 are made up of a combination of commute trips during the A.M. and P.M. peak hour periods and normal daily trips associated with residential and commercial activity in local communities. Primary employment centers include Pensacola metropolitan area to the west and Fort Walton Beach and Panama City to the east. The Base is also a significant source of daily traffic on US 98, particularly during the A.M. and P.M. peak hours. Residential trips are composed primarily of shopping, recreation, and school-oriented travel. Commercial trips are primarily associated with truck delivery traffic with local, regional, statewide, or even national origins and destinations. US 98 is heavily congested during the A.M. and P.M. peak hours, summer weekends, and holiday weekends. Community schools are shown in Figure A-15 in Appendix A. Figure A-16 in Appendix A shows populated areas around the reservation.

Emergency Service Providers and Emergency Travel Requirements

Emergency service providers include:

- Florida Highway Patrol
- Okaloosa County Office of Emergency Management
- Fort Walton Police Department
- Fort Walton Fire Department
- Okaloosa County Sheriff's Department
- Okaloosa County Emergency Medical Services (EMS) (Ambulance)
- Santa Rosa Office of Emergency Management
- Santa Rosa County Sheriff's Department
- Rural Metro Ambulance (Santa Rosa County ambulance service provider)
- Santa Rosa County and Municipality Fire/Rescue
- Milton Police Department
- Walton County Sheriff's Department

Hospital locations are shown on Figure A-15 Appendix A. US 98 is identified as a "Critical Traffic Link" with respect to the capacity for emergency services providers to respond in an emergency (Santa Rosa County Division of Emergency Management 2001).

3.2 SOCIOECONOMICS

The communities surrounding the Eglin Reservation are both directly and indirectly affected by economic impacts through the daily operation of Eglin AFB. The counties of Okaloosa, Santa Rosa, and Walton are measurably affected economically by Eglin's operations. The impact of the Proposed Action's added socioeconomic effects can be measured through changes (in terms of magnitude and geographic extent) in key socioeconomic indicators. The principal socioeconomic indicators that may be affected either directly or indirectly by the Proposed Action are:

- **Population**. Presented as general demographics of each county's inhabitants as a total population number.
- **Employment**. Shown as a measurement of each county's average employment and unemployment figures.
- **Tourism**. Each of the three counties has a Tourist Development Council, Visitors Center or Chamber of Commerce that manages their tourism. Tourism information is presented in a metric that captures the respective county's impact from tourism.
- **Restricted Access.** Discussed as the availability of water and land areas to the public for commercial or recreational use and the temporary closure of these areas.

- **Environmental Justice.** Discussed as the demographics of each county's inhabitants in terms of percent minority and income.

Socioeconomics of the Eglin Military Complex are interdependent with the economies of Okaloosa, Santa Rosa, and Walton counties. Nearly 25 percent of Okaloosa County's employment depends on Eglin AFB and Hurlburt Field combined. Overall, 10 percent of the employment for the three-county area is attributable to Eglin AFB and Hurlburt Field.

3.2.1 Population

The communities of Cinco Bayou, Crestview, Destin, Fort Walton Beach, Mary Esther, Niceville, Shalimar, and Valparaiso have been identified as the communities most affected by base activities. In addition, the unincorporated areas of Navarre, Navarre Beach, and Holley have been significantly affected by the growth of Hurlburt Field and its activities. These cities' populations for 2000 are shown in Table 3-3.

Table 3-3. 2000 Population for Okaloosa County Cities

Cities	2000 Population
Cinco Bayou	447
Crestview	14,984
Destin	12,320
Fort Walton Beach	22,220
Mary Esther	4,454
Niceville	12,126
Shalimar	667
Valparaiso	6,740
Unincorporated	112,264

Source: University of Florida, 2000

Table 3-4 presents the population (by county) in total numbers along with the state population numbers.

Table 3-4. Population of Florida Counties within the ROI

County	2000 Population	1990 Population	Percent Change
Okaloosa County	170,498	143,776	+18.6 %
Santa Rosa County	117,743	81,608	+43.7 %
Walton County	40,601	27,760	+46.3 %
Total	***328,842***	***264,648***	***+24.2 %***
State	**15,982,378**	**12,937,926**	**+23.5 %**

Source: U.S. Bureau of the Census, 2001

A side note to these population numbers is that at the turn of the 20th century (1900) the total Florida statewide population was only 528,542. Only two of the counties surrounding Eglin had measurable population back then, Santa Rosa with 10,293 and Walton with 9,346 people.

3.2.2 Employment

Table 3-5 shows the employment data (by county) in total numbers along with the state and national employment numbers. The labor force comprises all non-institutionalized civilians, 16 years and over, classified as either employed or unemployed, and allocated geographically by place of residence. Employment, as defined by the U.S. Bureau of Labor Statistics, includes all persons who are, in some form, exchanging labor for compensation.

Table 3-5. Labor Force Summary: 1992 – 2000 (Annual Average)

Jurisdiction	Labor Force		Employment		Unemployment		
	1992	2000	1992	2000	1992	2000	
Okaloosa County	67,701	82,486	63,338	79,776	4,363	2,710	(3.3%)
Santa Rosa County	41,596	53,318	39,249	51,425	2,347	1,893	(3.6%)
Walton County	13,166	16,404	12,387	15,881	779	523	(3.2%)
ROI Total (Percent)	**122,463**	**152,198**	**119,933**	**114,974**	**7,489**	**5,126**	**(3.67%)**
State of Florida	6,523,000	7,490,307	5,990,000	7,221,499	533,000	268,808	(3.6%)
United States	126,982,000	135,888,000	117,598,000	131,759,000	9,384,000	5,656,000	(4.0%)

Source: U.S. Bureau of Labor Statistics, 2001a.
Note: 2000 data is not seasonally adjusted.

3.2.3 Tourism

Tourism in these three counties has significantly increased during the period FY 1988 to 2000, especially in Okaloosa County. Tourism is the largest private industry in Florida and the largest private industry in Okaloosa County (Okaloosa County Tourist Development Council [TDC], 2001). Each of these counties has created a Tourism Development Council under Chapter 125.0104, Florida Law, which enables each county to levy a tourist development tax, also known as the “bed tax,” placed on transient lodging facilities and paid by visitors to the counties.

Since the TDC began operations, tourist development income has increased an average of 10.5 percent each year since 1989/1990 in Okaloosa County. An estimated 4.5 million tourists visited the Okaloosa County area in 1999/2000, compared to 49 million visitors who traveled to Florida in 1999. This provided an estimated $950 million in economic activity to this area, a large increase from $134 million in 1989/1990. In addition, this activity supported an estimated 32,000 local tourism-related employment opportunities (Okaloosa County Tourist Development Council, 2001).

Eglin AFB plays a vital role in the area’s tourism and growth by their environmental stewardship of the base areas that are open to the public. Portions of Santa Rosa Island are open to public access near the Destin Pass. These open, pristine beaches that belong to Eglin are used very heavily over the summer months.

Table 3-6 shows the counties’ Tourist Development Council Economic Activity results for dollars contributed to local counties’ economies.

Table 3-6. Tourist Development Council Economic Activity

County	FY 1989-90	1999/2000
Okaloosa	$134,000,000	$950,000,000
Santa Rosa	*	$82,000,000
Walton	*	*

* Data not available

3.2.4 Socioeconomic Interdependencies Between Eglin AFB and the Region

Each of the three socioeconomic indicators at Eglin summarized above has direct and secondary socioeconomic effects on the surrounding region. For example:

- Eglin provides employment opportunities for the region, which in turn provides an available labor pool to the base. Traffic and circulation trends described in Section 3-2 are a direct result of employment opportunities and population growth in the region.
- The total earnings of the Eglin population provide substantial potential revenues for the region. The availability of labor and other desired products and services within the region influence the amount of local spending.
- Eglin's expenditures for products and services, including those associated with the MEU Training Proposed Action, support existing businesses and provide incentives for contractors to locate offices within the region. The amount of expenditures directed to local businesses and the ability to attract new business are influenced by the regional availability and cost of living.

3.2.5 Restricted Access

In addition to socioeconomic and transportation effects, the MEU Training Proposed Action at Eglin also includes restrictions in terms of public access to military property. Access would be restricted by temporarily limiting the availability of water or land areas (e.g., roads) to the public at times when the MEU training is in progress. The purpose of restricting access to the public (and other military users) during these times is to ensure their safety while maintaining integrity of the MEU training.

3.2.5.1 Existing Waterway Restrictions

Currently, restricted areas, prohibited areas, and danger zones in the Gulf of Mexico and the Intracoastal Waterway are outlined on nautical charts and are described in the *U.S. Coast Pilot*, Vol. 5 (U.S. Department of Commerce, 1996). Controlled Firing Areas (CFAs) allow for hazardous activities within an airspace but are not charted since they do not result in course changes by nonparticipating aircraft.

Definitions as they appear in the *U.S. Coast Pilot* are:

> ***Danger Zone –*** *A defined water area (or areas) used for target practice, bombing or rocket firing, or other especially hazardous operations, normally for the armed forces.*

The danger zones may be closed to the public on a full-time or intermittent basis as stated in the regulations.

***Restricted Area** – A defined water area for the purpose of prohibiting or limiting public access to the area. Restricted areas generally provide security for Government property and/or protection to the public from the risks of damage or injury arising from the Government's use of that area.*

"Danger zones and restricted areas are to provide for public access to the area to the maximum extent practicable" and "the authority to prescribe danger zone and restricted area regulations must be exercised so as not to unreasonably interfere with or restrict the food fishing industry. Whenever the proposed establishment of a danger zone or restricted area may affect fishing operations, U.S. CEC District Engineer will consult with the Regional Director, U.S. Fish and Wildlife Service, Department of the Interior, and the Regional Director, National Marine Fisheries Service, National Oceanic and Atmospheric Administration."

***Controlled Firing Area** – A defined airspace block that contains activities that would be potentially hazardous to nonparticipating aircraft. Activities are immediately suspended if spotter aircraft, radar, or ground lookouts identify an aircraft approaching the area. CFAs must be renewed by the Federal Aviation Administration (FAA) every two years (U.S. Air Force, 2001f).*

According to the Eglin Safety Office, MEU training activities in the Intracoastal Waterway and the Gulf would require a Notice to Mariners (NOTMAR). Further, if nonmilitary personnel were to enter into, or near, the landing areas, training activity would simply cease until the area was cleared.

3.2.5.2 Commercial Shipping

The Gulf Intracoastal Waterway crosses through several northern Gulf inland water bodies adjacent to Eglin property and is the primary shipping route through Choctawhatchee Bay and Santa Rosa Sound for vessels transporting oil, coal, chemical products, and other bulk items. The U.S. Army Corps of Engineers (ACE) maintains data on the number of vessels using the waterway, as well as the amount of items shipped. From 1990 to 1999, vessels (tankers, tugs, and barges) averaged 8,400 trips over the Intracoastal Waterway through Choctawhatchee Bay, averaging 115 million tons per year. Trips for other years were estimated based on 1998 average tons per trip. Barge boat-miles traveled through the Bay would approximate 250,000 miles per year based on length of the Bay (30 miles) times number of trips (8,400).

3.2.5.3 Commercial Fishing

The Gulf of Mexico is the single most important commercial fishing area in the United States (U.S. Department of Commerce, 1985). Commercial fishing in the Gulf of Mexico in 2000 produced over 1.79 billion pounds valued at over $990 million (NMFS, 2001). Commercial fishing is generally concentrated along the coastline and extends west.

Commercial fisheries are a valuable industry in northwest Florida, worth over $3.5 million in 1997 from Gulf County alone (FDEP, 1998). The estimated number of fishing vessels operating in Florida waters decreased from 2,264 in 1992 to 2,128 in 1993 (Holliday and O'Bannon, 1995), yet the economic contribution from commercial fisheries in and adjacent to the Eglin Gulf Test and Training Range has increased over recent years. Since 1993, the commercial fisheries have brought in more that $150 million per year in total commercial fishery landings for the west coast of Florida.

In addition to the Gulf and Intracoastal Waterway, two commercial fish camps are located near the end of Highway 89 and provide access to the Yellow River; a public landing is located at the south end of the Highway 87 Bridge. Fishing from these locations has generally suffered from drought conditions over the last two years. According to the Florida Fish and Wildlife Conservation Commission (FWC), a year or more of normal rainfall may be necessary to restore the quality of fishing on the Yellow River (FWC, 2001).

3.2.5.4 Recreation

Fishing and Boating

The northern Gulf of Mexico coastal zone is one of the major recreational regions of the United States, particularly for marine fishing and beach activities. Its resources include coastal beaches, barrier islands, coral reefs, estuarine bay and sounds, river deltas, and tidal marshes. Many of these are held in trust for the public under federal, state, and local jurisdiction (i.e., parks, landmarks). Commercial facilities such as resorts and marinas are also primary areas for tourist activity.

Outdoor recreational activity in the Gulf is primarily located along the shoreline and is associated with accessible beach areas. Beaches are a major focal point for tourism as well as a primary source of recreational activity for residents.

The Gulf waters are estimated to support more than one-third of the nation's marine recreational fishing, with over 2.6 million anglers in 2000 who caught an estimated 149 million fish during more than 20 million individual fishing trips. Recreational fishing activities usually occur within three miles of the shoreline, with anglers fishing from shore or from private or charter boats.

Recreational boating interests include the use of sailboats, powerboats, and personal watercraft on freshwater lakes, inlets, estuaries, sounds, and in the Gulf. These watercraft activities lie almost entirely within three miles of the shoreline, limiting conflicts with military activities.

Recreational use of the Yellow River, East Bay, and East Bay River include fishing, crabbing, boating and canoeing, camping, and swimming. Long stretches of the river are undeveloped and provide good wildlife viewing opportunities. The current averages 2 to 3 miles per hour (mph) on the lower section and increases to over 3 mph on the upper sections where the grade is steeper. Motorboats are more numerous on the lower sections where the fishing is better. The Yellow River Canoe Trail, which begins north of the reservation, extends 31 of its 56 miles along the reservation boundary. The canoe trail may be accessed at the State Road 2 Bridge at Oak Grove, the U.S. 90 Bridge west of Crestview, a boat ramp on State Road 189, and the State Road 87 Bridge. Figure A-17, Appendix A, shows recreation and conservation areas associated with the Yellow River, East Bay, and East Bay River.

Land Recreation

Under the Sikes Act, Conservation Programs on Military Reservations (16 USC 670a to 670o; 1997-Supp, Sikes Improvement Act of 1997), DoD, in a cooperative plan with DOI and State, opens Air Force bases to outdoor recreation and conserves and rehabilitates wildlife, fish, and game on each reservation. The Air Force is to manage the natural resources of its reservations to provide for biodiversity maintenance, sustained multipurpose use, and public use.

There are various public recreational activities that take place in the interstitial area of Eglin AFB (Figure A-17, Appendix A). Approximately 280,000 acres of land are open for outdoor recreation. Outdoor activities include hunting, fishing, hiking, and camping, the most popular being hunting and fishing. Approximately 16,000 recreational permits are issued per year, with roughly 4,000 hunting permits issued. The Eglin reservation is closed to all public use and access from 2 hours after sunset until 2 hours before sunrise except for authorized activities as set forth in the Outdoor Recreation, Hunting, and Fresh Water Fishing Map and Regulations (U.S. Air Force, 2003c).

There are 17 management units, each having its own regulations associated with seasons, hunting rules and regulations, mission activities, and access to the public and DoD-affiliated persons. All persons that engage in outdoor recreational activities are required to adhere to applicable Eglin AFB, federal, and state laws, rules, and regulations (Florida Game and Fresh Water Fish Commission, 1997). General regulations are in place that address prohibited actions; for example, disturbing or removing any government property from the Eglin Reservation. Entry into both "closed" areas and "seasonally closed" areas is prohibited unless special permission has been granted by the Commander, Eglin AFB. Areas designated as "open," such as the east end of Okaloosa Island, are available for all types of outdoor recreation with the exception of hunting. All rules and regulations for recreational activities can be obtained from Natural Resources Management (AAC/EMSN) at Eglin AFB (U.S. Air Force, 2003c).

Recreational, hunting, and fishing permits are required for anyone 16 years or older entering Eglin AFB and may be obtained from Natural Resources Management. Table 3-10 shows the dates of the Eglin Air Force Base 2002-2003 Hunting Seasons.

Table 3-7. Eglin ADB 2002-2003 Hunting Seasons

Hunting Activity	Dates of Season
Archery	19 October-17 November
Early Muzzle-loading Gun	22-24 November
General Gun	28 November-1 December, 14 December-5 January, 25 January-9 February
Late Primitive Weapon	14-17 February, 21-23 February
Early Small Game*	9 November–20 February
Late Small Game	6-24 January
Dove	To be announced
Spring Turkey	15 March-20 April
Varmint/Predator**	15 May–31 August
Trapping	14 December–1 March
Mobility Impaired Hunt	1-2 February
Youth Hunt	8-9 February
Special Opportunity Turkey Hunt	5-6 April, 12-13 April

* Only within Management Unit 6 and the area north of Range Road 211, west of State Road 85 and east of State Road 87
** Management Units 10 and 12 only

While these date are only valid for the 2002-2003 hunting seasons, they are indicative of the approximate dates that seasons fall on annually. Those persons hunting, fishing, or in possession of equipment used for these activities must have applicable state and federal licenses, stamps, and permits, as well.

Public access to the ranges has increased over the years based on Jackson Guard Natural Resource Branch information. Recreational permits (hunting, fishing, camping, etc) have increased from 11,943 in FY 1996 to 13,158 in FY 2000. This is a public access increase to the Eglin Military Complex of 10 percent.

The Fish and Wildlife Section is responsible for managing outdoor recreation activities; threatened, endangered and nongame species; and fish and game. Outdoor recreation management activities include hunting, fishing, camping, and hiking. Figure A-17 in Appendix A illustrates those areas open to outdoor recreation activities, depicting campgrounds found at Eglin AFB and also the Florida National Scenic Trail route across Eglin AFB. Camping on base is authorized at designated campsites only, and over 15 camping areas are located throughout the base. Closures and restricted access to certain recreational lands due to MEU training activities are analyzed for potential impact to the public. The continued DoD utilization of the Eglin Military Complex requires flexible and unencumbered access to land ranges and airspace, which support all of Eglin's operations.

The public is presently restricted from accessing LZs, Auxiliary Fields, and Test Areas because of the sensitivity and potential danger of munitions testing and training operations.

3.2.6 Environmental Justice

On 11 February 1994, Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was issued with the directive that during the National Environmental Policy Act (NEPA) process, federal agencies adopt strategies to address the environmental concerns of minority and low-income communities that may be impacted by the implementation of federal actions. The intent of the Executive Order is to ensure that no individual or community, regardless of race, ethnicity, or economic status, bears a disproportionate share of adverse environmental impacts to human health or environmental condition resulting from the execution of federal actions. The purpose of environmental justice is to identify disproportionate human health and safety and environmental impacts on specific socioeconomic groups (i.e., minorities and low income communities) and identify appropriate alternatives.

There are no low-income or minority individuals or communities that would experience a disproportionate adverse health, safety, or environmental impact from the execution of military missions within the proposed MEU training areas. The Environmental Justice issues that could potentially be associated with the decision regarding the Proposed Action for the training areas are public access to the waters of the Gulf of Mexico, Santa Rosa Sound, Choctawhatchee Bay, East Bay, and the Yellow River; public access to recreation areas on Eglin Reservation; noise from increased operations; and safety from live-fire operations. Figure A-18 in Appendix A shows the minority/low income and demographic data for the area.

The access of the public to the water areas and land recreation areas during mission activities is restricted regardless of socioeconomic status for safety and security reasons and does not adversely impact individuals or communities of concern. In the amphibious landing areas, closures do not currently occur during the majority of military activities, rather military activities are ceased if a nonparticipant enters the area. Any increase in noise would primarily affect communities along the waterfront and Eglin boundaries. Live-fire exercises present potential increased safety issues but would be managed by activation of safety footprints. Adverse impacts to subsistence fishing or hunting associated with the Proposed Action have not been identified.

The Executive Order also requires the application of equal consideration for Native American programs. This may include the protection of Native American tribal lands and resources such as treaty-protected resources, cultural resources, and/or sacred sites. This issue, along with the associated public participation mechanisms, is fully addressed via Eglin's compliance with the following:

- The Antiquities Act of 1906
- The Sites Act of 1935
- The National Historic Preservation Act of 1974
- The Archaeological Resources Protection Act of 1979
- The Native American Graves Protection and Repatriation Act of 1990
- The American Indian Religious Freedom Act

Procedures for compliance with the above laws are outlined in Eglin's Cultural Resource Management Plan (U.S. Air Force, 1997). As a result, an additional analysis was not included in this Environmental Assessment. Figure A-16 in Appendix A shows the demographics of populated areas near Eglin AFB. Figure A-18 in Appendix A shows Environmental Justice areas of concern.

3.3 NOISE

3.3.1 Definition of the Resource

Noise is sound that injures, annoys, interrupts or interferes with normal activities or otherwise diminishes the quality of the environment. It may be intermittent or continuous, steady or impulsive. It may be stationary or transient. Stationary sources are normally related to specific land uses (e.g., industrial plants or some military training activities). Transient noise sources move through the environment, either along relatively established paths (e.g., highways, railroads, and aircraft flying a specific flight track), or randomly (e.g., military training conducted in a training area). There is wide diversity in responses to noise that vary not only according to the type of noise and the characteristics of the sound source, but also according to the sensitivity and expectations of the receptor, the time of day, and the distance between the noise source (e.g., an aircraft) and the receptor (e.g., a person or animal).

The physical characteristics of noise, or sound, include its intensity, frequency, and duration. Sound is created by acoustic energy, which produces pressure waves that travel through a medium, like air, and are sensed by the eardrum. This may be likened to the ripples in water produced by a stone being dropped into it. As the acoustic energy increases, the intensity or amplitude of the pressure waves increase, and the ear senses louder noise.

Sound intensity varies widely (from a soft whisper to a jet plane or a gunshot) and is measured on a logarithmic scale to accommodate this wide range. The logarithm, and its use, is nothing more than a mathematical tool that simplifies dealing with very large and very small numbers. For example, the logarithm of the number 1,000,000 is 6, and the logarithm of the number 0.000001 is -6 (minus 6). Obviously, as more zeros are added before or after the decimal point, converting these numbers to their logarithms greatly simplifies calculations that use these numbers.

The frequency of sound is measured in cycles per second, or hertz (Hz). This measurement reflects the number of times per second the air vibrates from the acoustic energy. Low frequency sounds are heard as rumbles or roars, and high frequency sounds are heard as screeches.

Sound measurement is further refined through the use of “weighting.” The normal human ear can detect sounds that range in frequency from about 20 Hz to 15,000 Hz. However, all sounds throughout this range are not heard equally well. Therefore, through internal electronic circuitry, some sound meters are calibrated to emphasize frequencies in the 1,000 to 4,000 Hz range. The human ear is most sensitive to frequencies in this range. When measuring these sounds that continue over some time period (such as an aircraft overflight) with these instruments, the levels are termed “A-weighted” and are shown in terms of A-weighted decibels (dBA). Conversely, when describing large amplitude impulsive sounds of extremely short duration such as a gunshot, the total amount of acoustic energy created is an important consideration. Sounds of this nature are normally measured on the "C-weighted" scale, which gives nearly equal emphasis to sounds of most frequencies. Mid-range frequencies approximate the actual (unweighted) sound level, while the very low and very high frequency bands are significantly affected by C-weighting. When measured, these sounds are shown in terms of C-weighted decibels (dBC).

The duration of noise events and the number of times noise events occur are also important considerations in assessing noise impacts.

The word “metric” is used to describe a standard of measurement. As used in environmental noise analysis, there are many different types of noise metrics. Each metric has a different physical meaning or interpretation and each metric was developed by researchers attempting to represent the effects of environmental noise.

The metrics supporting the assessment of noise that would result from the conduct of the proposed training activities on and around Eglin AFB include both A- and C-weighted single event and time-averaged cumulative metrics. Each metric represents a “tier” for quantifying the noise environment and is briefly discussed below.

Sound Pressure Level

The Sound Pressure Level (SPL) is the actual amount of acoustic energy created by the event. It represents the event's maximum, unweighted sound level. It is characterized as the maximum acoustic sound pressure in decibels (dBP). Impacts to people and animals from impulsive noise (e.g., a bomb explosion) are sometimes expressed in terms of dBP.

Sound Exposure Level

The Sound Exposure Level (SEL) metric combines the intensity and duration of a noise event into a single measure. It is important to note, however, that SEL does not directly represent the sound level heard at any given time, but rather provides a measure of the total exposure of the entire event. Its value represents all of the acoustic energy associated with the event, as though it was present for one second. For sound events that last longer than one second, the SEL value will be greater than the maximum noise level created by the event. For sound events that last less than one second, the SEL value will be less than the maximum acoustic pressure (dBP). The duration of many impulsive sounds, such as gunfire, is significantly less than one second. This, when coupled with the extremely low frequencies associated with such sounds that are repressed on the C-weighted scale means that the "sensed" or "perceived" sound may be 20 dB or more below the actual sound pressure level. Nevertheless, the SEL value is important because it is the value used to calculate other time-averaged noise metrics.

Time-Averaged Cumulative Day-Night Average Noise Metrics

The equivalent sound level (L_{eq}) is a metric reflecting average continuous sound. The metric considers variations in sound magnitude over periods of time, sums them, and reflects, in a single value, the acoustic energy present during the time period considered. Common time periods for averaging are 1, 8, and 24-hour periods.

The Day-Night Average Sound Level (L_{dn}) also sums the individual noise events and averages the resulting level over a specified length of time. Normally, this is a 24-hour period. Thus, like L_{eq}, it is a composite metric representing the maximum noise levels, the duration of the events, and the number of events that occur. However, this metric also considers the time of day during which noise events occur. This metric adds 10 dB to those events that occur between 10:00 P.M. and 7:00 A.M. to account for the increased intrusiveness of noise events that occur at night when ambient noise levels are normally lower than during the daytime. It should be noted that if no noise events occur between 10:00 P.M. and 7:00 A.M., the value calculated for L_{dn} would be identical to that calculated for a 24-hour equivalent noise level [$L_{eq(24)}$]. This cumulative metric does not represent the variations in the sound level heard. Nevertheless, it does provide an excellent measure for comparing environmental noise exposures when there are multiple noise events to be considered.

In this document, sound levels associated with proposed military training activities are considered as 1- and 24-hour equivalent sound levels [$L_{eq(1)}$ and $L_{eq(24)}$]. If applicable, the L_{dn} metric would be used in lieu of the $L_{eq(24)}$ metric. Average Sound Level metrics are the preferred noise metrics of the Department of Housing and Urban Development (HUD), the Department of Transportation (DOT), the Federal Aviation Administration (FAA), the U.S. Environmental Protection Agency (USEPA), and the Veteran's Administration (VA). Scientific studies and

social surveys have found that Average Sound Level metrics are the best measure to assess levels of community annoyance associated with all types of environmental noise. Therefore, their use is endorsed by the scientific community and governmental agencies (ANSI 1980, 1988; EPA 1974; FICUN 1980; FICON 1992, U. S. Army 1994). In general, there are no recommended restrictions on any land uses at day-night average sound levels of 65 dBA or less (A-weighted), or 62 dBC or less (C-weighted).

3.3.2 Existing Conditions

In the project region, ambient noise (the surrounding background noise) currently exists as a result of transportation-related and other human activities. Many types of civil and military aircraft operate throughout the region, and also make use of the military training airspace overlying the area. Vehicles on roads are also sources of noise. Military units currently conduct a wide range of training activities on and in the immediate vicinity of Eglin AFB. This includes ground-based operations and testing and training for military pilots in designated military training airspace. Average ambient noise from community traffic and Eglin air operations are presented graphically in Figures A-71 and A-72 for the entire study area.

Traffic Noise

In addition to overall ambient traffic noise, existing noise from Highway 98 at Wynnhaven Beach and White Point was modeled using average daily traffic counts. The program used is the STAMINA Traffic Noise Prediction Model developed by Science Applications International Corporation (SAIC, 1984). Output for the model generated average day-night noise levels (L_{dn}) received at the residences closest to the proposed Wynnhaven Beach landing from Highway 98 traffic and at the Maxwell Gunter recreation area cabin closest to the proposed White Point landing area from White Point Road (SR 293) traffic (Table 3-8).

Table 3-8. Ambient Traffic Noise at Wynnhaven Beach and Maxwell-Gunter Recreation Area

Highway	Distance from Highway (feet)	Noise Level (L_{dn})
98 – East Residence	70	70.6
98 – West Residence	164	75.1
Maxwell-Gunter Rec Area Cabin	1,167	48.1

Aircraft Noise

Noise from Eglin aircraft operations was modeled by airspace block using the program MR_NMAP and expressed as L_{dn} (U.S. Air Force, 1996). Airspace blocks were then associated with the appropriate areas of the proposed action and listed in Table 3-9 with existing aircraft noise. The noise levels listed in Table 3-9 are illustrated as contours in Figures A-72.

Table 3-9. Ambient Aircraft Noise

Location	Airspace Block	Noise Level (Ldn)
Wynnhaven Beach	R-2915B	55-60
White Point	R-2919B	40-50
East Bay Point	None	No Data
Santa Rosa Island	R-2915C	45-55
Hammock and Alaqua Point	R-2914A	40-48

3.4 SAFETY

The existing safety environment encompasses risk to public health, and with respect to the proposed action, risk to the health of military personnel, and those measures designed to minimize that risk. For actions occurring on military property with inherent safety risks, procedures are in place that minimize or eliminate altogether risks to the public. Such measures include the designation of areas as “restricted” or “closed” to the public, either permanently or temporarily. Such closures are driven by the dimensions of the “safety footprint” of a particular action that may have potentially harmful noise, blast or other effects, or by the existence of unexploded ordnance from historical missions.

Safety Footprints

Safety footprints and their restrictions on land usage vary based on several factors, including weapon type, flight profile, altitude, speed, or flight system of the specified test activity.

When applying the individual weapon safety footprints to the test areas on base, it is the policy of the Range Safety Office (AAC/SEU) to apply a one nautical mile wide safety buffer that generally parallels the base boundary. The external boundary of this safety buffer is the base boundary; the internal boundary is called the impact limit line. The impact limit line is the outermost boundary of allowable surface impact of items generated by the mission. In three areas (SR 87, around Hurlburt Field, and around Eglin Main) this safety buffer becomes wider than the one nautical mile wide area described above. The safety buffer not only protects off-base areas from activities on base, but also buffers the base from adjacent off-base land uses, thereby ensuring off-base safety and compatible land use. The buffer also can attenuate the noise of test area activities, mitigating that impact on surrounding communities.

Unexploded Ordnance (UXO)

Eglin AFB has been testing munitions for over 60 years. During its long history, a vast number of different munition items have been expended throughout the Range as part of routine training and special testing activities. While UXO is an unintended but unavoidable consequence of any operation involving energetic material, only recently has the Air Force published standards for munitions residue maintenance, remediation, and documentation. The situation is exacerbated by the fact that Eglin AFB has adapted its range to the needs of the mission many times and so has changed the locations and shapes of its targets and impact areas. Therefore, it is not possible to conclude that all or even most of the contamination is on the active impact areas.

Eglin has conducted an archive search in order to document the locations of formerly used ranges but has yet to conduct any base-wide assessment of UXO contamination suitable to support an analysis of risk to training units. Previous informal analyses have centered around identifying areas with low enough risk to allow public recreation or to outgrant nonexcess real property. Currently, the Air Armament Center Directorate of Safety (AAC/SE) office handles requests on a case-by-case basis and controls the risk by limiting the type, location, or frequency of the requested action based on an informal risk assessment using local historical knowledge, the U.S. Army Corps of Engineers Archive Search Report, and the Eglin Reservation Explosives Contamination study from July 1976.

Wildfires

Wildfires are usually detected by Jackson Guard personnel, Civil Air Patrol aircraft, military aircraft, Florida State Division of Forestry (DOF) fire towers, mission control personnel, and the public. There are four fire towers that Eglin uses only under severe fire hazard conditions: Jackson Guard, Okaloosa, Ramer, and Metts Towers. There are two other towers utilized that are owned by the Florida DOF: the Crestview Tower (Okaloosa County) and the Coldwater Tower (Santa Rosa County).

Some causes of wildfire include mission activities, arson, carelessness of children and hunters/campers, lightning, and downed power lines. Most wildfires on Eglin occur around test areas (historically 75 percent) from mission activities such as explosions and air-to-ground gunnery. There are two primary dry seasons on Eglin when fire hazards increase (April through May and mid-September through November); however, the fire season is year-round (U.S. Air Force, 2002). The high-intensity storms that frequent this area not only deliver significant amounts of rain, they also create frequent air-to-ground lightning strikes, which can easily start wildfires.

These lightning events and associated wildfires were instrumental in sustaining fire-dependent plant communities such as the Longleaf Pine-Wiregrass association. However, recent history has shown that wildfires can still have widespread, devastating effects on the landscape. Table 3-10 presents causes of wildfire data from 1990 through 1999 for Eglin.

Once a fire is started, it can spread to adjacent forested buffer zones. The fires are either extinguished or allowed to burn under control if they may have any beneficial effects. Wildfires have decreased on Eglin since 1986. The numbers of wildfires have decreased because of fire management practices such as prescribed burns, which decrease fuel availability for wildfires. In Florida 4,500 wildfires were reported on an average annual basis between 1990 and 2000 (Florida Forest Protection Bureau, 2001) with an average of about 109 of those occurring each year on or near the Eglin Reservation, burning an average of approximately 8,300 acres per year (U.S. Air Force, 2001g).

Table 3-10. Eglin AFB Wildfires for 1990 Through 1999

Cause	Metric	Year									
		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Air Force Mission	*Number of Fires*	104	105	58	64	51	45	38	40	42	27
	Acres Burned	2474	3357	1797	4322	4295	9554	9640	2614	11917	4500
	Average Size (ac)	24	32	31	68	84	212	254	65	283	166
Army Mission	*Number of Fires*	30	9	6	19	11	11	10	20	18	20
	Acres Burned	808	45	28	726	314	2627	1245	755	6140	860
	Average Size (ac)	27	5	5	38	29	239	125	38	341	43
Arson	*Number of Fires*	25	2	8	5	3	6	22	1	5	4
	Acres Burned	248	11	345	6	56	2696	2418	6	60	203
	Average Size (ac)	10	6	43	1	19	449	110	6	12	51
Children	*Number of Fires*	1	1	2	2	5	2	3	5	3	2
	Acres Burned	30	8	23	0	10	251	101	24	0.2	0.5
	Average Size (ac)	30	8	12	0	2	126	34	5	0.66	0.25
Hunters	*Number of Fires*	0	1	3	0	0	0	1	0	1	2
	Acres Burned	0	40	58	0	0	0	10	0	0.25	9
	Average Size (ac)	0	40	19	0	0	0	1	0	0.25	4.5
Lightning	*Number of Fires*	17	1	9	7	1	4	2	3	6	5
	Acres Burned	447	2	138	225	50	221	1	18	174	32
	Average Size (ac)	26	2	15	32	50	55	0	6	29	6.4
Miscellaneous	*Number of Fires*	6	6	6	4	9	9	9	9	9	6
	Acres Burned	54	110	114	35	986	546	12	346	543	438
	Average Size (ac)	9	18	19	9	110	61	1	38	60	73
Powerline	*Number of Fires*	2	2	3	4	1	1	2	0	2	0
	Acres Burned		13	6	14	0	2	1	0	1.2	0
	Average Size (ac)	1	7	2	4	0	2	1	0	0.06	0
Unknown	*Number of Fires*	22	12	14	11	5	9	10	5	11	3
	Acres Burned	290	279	108	241	3	1286	44	94	1580	200
	Average Size (ac)	13	23	8	22	1	143	4	19	143	40

Source: U.S. Air Force, 2001g

Safety Regulations

Safety is the responsibility of Marine or Sailor at all times and is a key factor in successful training. Safety and operations must intertwine so that risk management and safety are a part of the planning and execution of all missions, exercises, and daily evolutions. The key to safe training is the understanding that each and every individual regardless of rank is a safety manager. Any individual who observes an unsafe condition should report this immediately to the chain of command so that the activity in question, be it a training event or any other activity, may be halted until the unsafe condition has been corrected.

Local range standard operating procedure (SOP) prescribes the regulations and general precautions to be taken in the firing or other use of live ammunition, simunitions, nonlethal weapons training devices, and energy-producing weapons/equipment and explosives, as well as the use of test areas, live fire ranges, mortar positions, gun positions, training/maneuver areas,

airspace, tactical and administrative landing and drop zones, waterways, beaches, littoral waters, and other training facilities at Eglin AFB.

The safety regulations, as prescribed in local range SOPs and current Marine Corps orders and naval instructions will apply to ARG/MEU training under the Proposed Action. Training units will conduct a safety brief and review range SOPs prior to any live fire training.

The following list of standards and regulations will apply to safety for the MEU training under the Proposed Action. AAC safety procedures will be followed while on the Eglin Reservation except where USMC procedures are more restrictive.

29 CFR 1910.120, 1996, Occupational Safety and Health Act, Chemical Hazard Communication Program (OSHA). Requires that chemical hazard identification, information and training be available to employees using hazardous materials, and institutes material safety data sheets (MSDS) that provide this information.

Department of Defense Instruction 6055.1. Establishes occupational safety and health guidance for managing and controlling the reduction of radio frequency exposure.

Department of Defense Flight Information Publication. Identifies regions of potential hazard resulting from bird aggregations or obstructions, military airspace noise sensitive locations, and defines airspace avoidance measures.

Air Force Instruction 32-2001, 8-Oct-99, The Fire Protection Operations and Fire Prevention Program. Identifies requirements for Air Force structural fire protection programs (equipment, response time, and training).

Air Force Instruction 32-7063, 1-Mar-94, Air Installation Compatible Use Zone Program (AICUZ). The AICUZ Study defines and maps accident potential zones and runway clear zones around the installation and contains specific land use compatibility recommendations based on aircraft operational effects and existing land use, zoning, and planned land use.

Air Force Manual 91-201, 12-Jan-96, Explosives Safety Standards. Regulates and identifies procedures for explosives safety and handling as well as defining requirements for ordnance quantity distances, safety buffer zones, and storage facilities.

Air Force Instruction 91-301, 1-Jun-96. Air Force Occupational and Environmental Safety, Fire Protection and Health (AFOSH) Program. Identifies occupational safety, fire prevention, and health regulations governing Air Force activities and procedures associated with safety in the workplace.

Air Force Instruction 13-217, Assault Zone Procedures. Requires a survey for safety and environmental considerations of all potential helicopter-landing zones before use.

Air Force Operational Plan 32-1, Wildfire Procedures and Restrictions. Identifies the procedures for reporting wildfires and the restrictions associated with preventing wildfire occurrence.

3.5 SOILS/EROSION

The Eglin reservation is home to a diversity of soil types with unique physical and chemical characteristics that in combination with a subtropical climate partly determine the structure and function of ecosystems. The characteristics of geologic formation parent materials underlying the Eglin reservation have a strong influence on soil formation and development.

3.5.1 Soil Series

There are approximately 63 soil series that comprise the soil environment of the Eglin Military Complex (to include Santa Rosa Island). Of these, 16 occupy total land areas of less than 50 acres, 43 occupy about 15 percent (74,409 acres), and 4 soils (Dorovan muck, Dorovan-Pamlico Association, Troup sand, and Lakeland sand) comprise 84 percent of Eglin soils. Information on these four soils, as well as the Newhan-Corolla Complex (which comprises most of Santa Rosa Island) is given in narratives below.

Lakeland Soil Series

The Lakeland series consists of very deep, very strongly acidic soils that formed in thick beds of eolian, fluvial, or marine sands on broad, nearly level to very steep uplands in the Lower Coastal Plain. Depth to seasonal water table is more than 80 inches. All horizons are sand or fine sand with 5 to 10 percent silt plus clay in the 10- to 40- inch control section. Slopes are dominantly 0 to 12 percent, but range to 85 percent in dissected areas.

Dorovan Series

The Dorovan series consists of very poorly drained, moderately permeable soils on densely forested flood plains, hardwood swamps, and depressions of the Coastal Plains. They formed in highly decomposed acid-organic materials. Slopes range from 0 to 2 percent but are normally less than 1 percent. The organic material ranges from 51 to more than 80 inches thick. It is extremely acid or very strongly acid in the organic layers. It is strongly acid or very strongly acid in the 2C horizon. The soil is saturated to the surface most of the time. Runoff is very slow and water is ponded on the surface in depressions. The underlying mineral sediments commonly are loamy or sandy and are very strongly acid or strongly acid.

Newhan Series

The Newhan series consists of excessively drained soils, rapidly permeable soils formed from sands deposited by wind. Runoff is slow. These soils are on gently undulating dunes commonly near beaches and waterways along the coast. Slopes are commonly 2 to 7 percent but range from 0 to 30 percent. The elevation of these soils commonly ranges up to about 75 feet or more above mean sea level. The soil consists of sand and shell fragments deposited mainly by wind along the Atlantic Coast. However, some areas are a result of dredge spoil material. Slopes range from 0 to 30 percent. Thickness of the A and C horizons is more than 72 inches. Reaction is extremely acid to slightly alkaline. Calcareous shell fragments mostly of sand size make up to 35 percent of the soil by volume. The soil contains few to common grains of dark minerals. Silt plus clay in the 10- to 40- inch control section is less than 5 percent.

Pamlico Series

The Pamlico series consists of very poorly drained soils that formed in decomposed organic material underlain by dominantly sandy sediment. The soils are on nearly level flood plains, bays, tributaries of major streams, and depressions of the Coastal Plain. Runoff is very slow and flooding is rare to frequent. Permeability is moderate to moderately rapid in the organic layers and slow to very rapid in the mineral layers. Slopes are less than 1 percent. Pamlico soils have 16 to 51 inches of organic material over dominantly sandy sediments. Reaction is extremely acid (less than 4.5 in 0.01 M calcium chloride) in the organic layers, and ranges from extremely acid to strongly acid in the underlying mineral layers.

Troup Series

The Troup series consists of deep, somewhat excessively drained soils with thick sandy surface and subsurface layers and loamy subsoils. They formed in nearly level to steep unconsolidated sandy and loamy marine sediments on Coastal Plain uplands. Runoff is slow and permeability is moderate in the Bt horizon and rapid in the A and E horizons. Slopes are dominantly 0 to 15 percent but range to 40 percent. Solum thickness is more than 80 inches. Reaction of the surface and subsurface layers ranges from very strongly acid to medium acid, except where limed, and from very strongly acid to strongly acid in the subsoil. Base saturation of the control section is less than 30 percent and calcium content is less than 1 meq per 100 grams of soil. Thickness of the A and E horizons ranges from 40 to 79 inches. Percent by volume of quartz gravel and ironstone nodules ranges up to 10 percent in the solum.

3.5.2 Erosion

Soil erosion is a three-phase process of detachment, transport, and deposition of surface materials by water, wind, ice, or gravity initiated by drag, impact, or tractive forces acting on individual soil particles. It is a relentless process that is nearly impossible to stop, difficult to control, and easily accelerated by humans. Accelerated erosion caused by humans occurs at rates much greater than natural erosion conditions and has been shown to have detrimental effects on soils and ecosystems.

During rainfall events, water that reaches the surface is stored in depressions or infiltrates into the soil. When the soil is unable to take in more water, the excess moves downslope to areas of concentrated flow resulting in overland flow erosion. The result is on- and off-site consequences that can adversely affect the form and function of terrestrial and aquatic ecosystems. The immediate on-site net effect of erosion is loss of productivity that may alter the capability of the land to support plant and animal species and off-site problems may develop because of sediment deposition.

The susceptibility of the soil to erosion (erodibility) is primarily dependent on factors such as soil texture, moisture content, pH, and ionic strength of the eroding water. Soil erodibility generally decreases with increasing clay and organic matter content, whereas uniform silts and sands tend to have high soil erodibility (Gray and Leiser, 1982). Slope angle and length are the primary topographic variables influencing rainfall erosion. Slope length influence tends to increase with increasing slope angle. As an example, doubling slope length from 100 to 200 feet on a 6 percent slope would increase potential soil loss by 29 percent, whereas the same slope

length doubling on a 20 percent slope would increase potential soil loss by 49 percent. Vegetation plays a pivotal role in the interception and diffusion of water energy from rainsplash and overland water flows (Wischmeir and Smith, 1958).

Soil erosion is an important social and economic problem and an essential factor in assessing ecosystem health and function. It is associated with two major types of environmental damage: reduced land productivity and water pollution. Soil erosion results in the loss of biodiversity and habitats and degradation of water quality, sedimentation, and eutrophication of water bodies. Human-induced soil disturbances whether minor, transitory, or drastic generally determine the nature of environmental effects. The loss of soil constituents can significantly reduce the capacity of the soil to support life and the generation of sediment can be particularly devastating to water quality and aquatic ecosystems.

Some disturbances may be minor or transitory, allowing the landscape to reclaim productivity, while other disturbances may be characterized as ecosystem altering events. Drastically disturbed sites that exhibit the removal of plant and animal communities; removal of litter layers; and loss, alteration, or burying of surface soils will not heal themselves within the lifetime of man through natural successional processes (American Society of Agronomy, 1978). Examples of man-induced disturbances include urbanization, road building, clay pit mining, and test area maintenance and support operations and military testing and training missions.

Eroded soil particles moved and deposited by a watercourse are known as sediment, which can adversely alter water quality, habitats, and the hydrologic form and function of waterways and wetlands. Suspended sediment in waterways inhibits light penetration and photosynthesis and diminishes the aesthetic value of water bodies. Sediment deposition in waterways leads to premature filling of water bodies, exertion of large oxygen demands on the water, burial of benthic organism aquatic habitats, and alteration of stream hydrology. Introduction of sediments and the other pollutants into ecosystems at accelerated rates resulting from human activities can adversely impact terrestrial and aquatic environments, damage or destroy cultural resources, reduce recreation use and value of affected watersheds, and increase land management and operating costs.

Sediment deposition on other terrestrial systems can bury and kill vegetation and other organisms. Environmental damage potentials may be further expounded by the introduction of materials such as organic matter and soil-bound nutrients, pesticides, metals, or other compounds to receiving ecosystems. Sedimentation directly and indirectly impacts threatened and endangered wildlife and vegetation by altering habitats to a point that may exclude its use by species of concern.

3.6 WETLANDS

3.6.1 Regulatory Overview

Wetlands are defined in the U.S. Army Corps of Engineers (ACE) Wetland Delineation Manual as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (U.S. Army Corps of Engineers,

1987). All jurisdictional wetlands in the United States meet three wetland delineation criteria (hydrophytic vegetation, hydric soils, and wetland hydrology) and are protected under Section 404 of the Clean Water Act (33 United States Code Section 1344) and its implementing regulations found in 40 Code of Federal Regulations 230. Wetlands on federal lands are further protected under Executive Order (EO) 11990, which states "...each federal agency shall provide leadership and shall take action to minimize the destruction, loss or degradation of wetlands...."

FDEP's wetland program regulates dredge and fill activities in both fresh and salt waters under their jurisdiction. Waters adjoining Florida's coastline are also under the state's jurisdiction. Permit applications made to the FDEP can also serve as joint applications to initiate concurrent review by the ACE.

When considering a ground-disturbing project or action occurring in a wetland, numerous steps are required. First, the presence or absence of a wetland within the project site determines the potential for impacts and the need for necessary permits. Once potential impacts have been identified, this action cannot be taken if a practicable alternative exists. If, however, no practicable alternative exists to the proposed action, mitigation must be taken to minimize impacts in or adjacent to wetlands, and should be implemented early in the site planning process to reduce or eliminate direct and indirect impacts. The ACE and FDEP both have a formal process for determining a jurisdictional wetland. This delineation process would be accomplished in coordination with AAC/EMCE, AAC/EMSN, 16 SOW/CEV, and the proponent or his contractor.

Before an action adversely impacting wetlands may proceed, EO 11990 requires the head of the agency to find that there is no practicable alternative to conducting the action in wetlands. Mitigation measures may be necessary to minimize impacts. Additionally, an environmental assessment or a finding of no practicable alternatives report must be prepared and public notice of intent must be made before proceeding with ACE consultation.

3.6.2 Ecological Description

Wetland areas are sensitive habitat that are inundated (water covered), or where water is present either at or near the surface of the soil for distinguishable periods of time throughout the year. Local hydrology and soil saturation largely affects soil formation and development, as well as the plant and animal communities found in wetland areas. Hydric (wet), anaerobic (lacking oxygen) sediments resulting from the presence of water typify wetlands. Figure A-19, Appendix A, shows wetland areas on Eglin Air Force Base as identified in the National Wetlands Inventory (NWI), and Appendix F contains descriptions of the different wetland types found on Eglin.

Wetlands have been delineated at three sites with the potential for wetlands impacts: Wynnhaven Beach, Test Site A-13B, and Test Site A-11. At Wynnhaven Beach, 2.53 acres of wetland mixed forest and 1.14 acres of bay swamp are located in the operational footprint, for a total of 3.67 acres of wetlands. The crossover corridor at A-13B contains 7.10 acres of wet prairie, and 0.81 acres of salt marsh, for a total of 7.91 acres of wetlands. At A-11, starting at the primary dune line and moving inland, there are 2.80 acres of freshwater marshes, 0.27 acres of inland shores/ephemeral ponds, and 7.33 acres of wet prairie, for a total of 10.40 acres of wetlands.

In addition to the wetland sites at SRI and Wynnhaven, wetlands at RR 259, Hurlburt, and East Bay Point are also located within the ARG/MEU operational footprint. No wetlands south of the East Bay River Bridge on RR 259 are located within the footprint, but north of the bridge, 1.41 acres of palustrine and 0.004 acres of riverine wetlands (total 1.41 acres) are within the footprint for road widening. A total of 1.49 acres of palustrine wetlands at the Hurlburt landing site are within the landing zone footprint. At the East Bay landing site, 1.00 acre of palustrine wetlands and 3.28 acres of estuarine wetlands (total 4.28 acres) fall within the landing zone footprint.

Wetlands support both aquatic and terrestrial organisms. Large varieties of microbes, vegetation, insects, amphibians, reptiles, birds, fish, and mammals can be found living in concert in wetland ecosystems. Through a combination of high nutrient levels, fluctuations in water depth, and primary productivity of plant life, wetlands provide the base of a complex food-web, supporting the feeding and foraging habits of these animals for part of or all of their life cycle. During migration and breeding, many nonresident and transient bird and mammal species also rely on wetlands for food, water, and shelter.

3.7 FLOODPLAINS AND COASTAL ZONE

3.7.1 Regulatory Overview

Any actions being considered by federal agencies must be evaluated to determine whether they would occur within a floodplain (Executive Order 11988, Floodplain Management). Floodplains that must be considered include those areas with a 1 percent chance of being inundated by floodwater in a given year (also known as a 100-year floodplain).

The term “coastal zone” is defined as coastal waters and adjacent shorelands strongly influenced by each other and in proximity to the several coastal states, and including islands, transitional and intertidal areas, salt marshes, wetlands, and beaches. “Coastal waters” are defined as any waters adjacent to the shoreline that contain a measurable amount of sea water, including but not limited to sounds, bays, lagoons, bayous, ponds, and estuaries. The outer boundary of the coastal zone is the limit of state waters, which for the Gulf coast of Florida is 9 nautical miles from shore. The proposed action is to be conducted within Eglin airspace, land ranges, and water resources. As such, some components of this action would take place within the jurisdictional concerns of the Florida Department of Environmental Protection and therefore would require a consistency determination with respect to Florida’s Coastal Zone Management Plan and the Coastal Zone Management Act. FDEP also regulates activities in jurisdictional waters/wetlands through the Dredge and Fill Permitting Program.

Executive Order (EO) 11988, Floodplain Management (1977, 42 Fed. Reg. 26951), requires federal agencies to avoid adverse impacts associated with the occupancy and modification of floodplains and to avoid floodplain development whenever possible. Additionally, EO 11988 requires federal agencies to make every effort to reduce the risk of flood loss, minimize the impact of floods on human health, safety, and welfare, and preserve the natural beneficial value of floodplains. The order stipulates that federal agencies proposing actions in floodplains consider alternative actions to avoid adverse effects, avoid incompatible development in the floodplains, and provide opportunity for early public review of any plans or proposals. If adverse effects are unavoidable, the proponent must include mitigation measures in the action to minimize impacts.

Additionally, EO 11990, Protection of Wetlands (1977, 42 Fed. Reg. 26961), places additional requirements on floodplains when considered as wetlands in the EO. It requires federal agencies to avoid undertaking or providing assistance for new construction located in wetlands unless there are no practicable alternatives and all practicable measures to minimize harm to wetlands have been implemented. It also precludes federal entities from leasing space in wetland areas unless there are no practicable alternatives.

Parts of the floodplain that are also considered wetlands will, in addition to floodplain zonings, receive protection from federal, state, and local wetland laws. These laws, such as the U.S. Army Corps of Engineers section 404 Permit Program, regulate alterations to wetlands to preserve both the amount and integrity of the nation's remaining wetland resources.

The Coastal Zone Management Act (CZMA) provides for the effective, beneficial use, protection, and development of the U.S. coastal zone. Federal agency activities in the coastal zone are required to be consistent to the maximum extent practicable with approved State Coastal Zone Management Plans. Federal agencies make determinations whether their actions are consistent with approved State plans and submit these determinations for State review and concurrence. All relevant state agencies must review the proposed action and issue a consistency determination. The Florida Coastal Management Program (FCMP) is composed of 23 Florida statutes administered by 11 state agencies and four of the five water management districts.

The Florida Department of Environmental Protection (FDEP) will serve as the lead agency in FCMP matters involving the proposed MEU training activities at Eglin AFB. Information submitted to the state of Florida for consistency review will go through the Florida State Clearinghouse (Clearinghouse), located within the FDEP. The Clearinghouse will serve as the single point of contact for the various agencies. The information will be routed to all the appropriate state, regional, and local reviewers. Recommendations regarding the activity’s consistency are provided by member agencies to the FDEP, which makes the state’s final consistency determination. Information concerning MEU training at Eglin AFB will be received by the state at least 90 days prior to the initiation of the proposed activity. The state must complete its review and provide the federal agency with its consistency concurrence within 60 days of receipt of the information (30 days for state agency comments and 30 days for DEP to formulate a response). If the state does not provide its consistency concurrence within 60 days, the federal action is presumed to be consistent with the FCMP.

3.7.2 Floodplain Description

Floodplains are lowland areas adjacent to surface water bodies (i.e., lakes, wetlands, and rivers) that are periodically covered by water during flooding events. Floodplains carry and store floodwaters during flood events. Floodplains and riparian habitat are biologically unique and highly diverse ecosystems providing a rich diversity of aquatic and terrestrial species, acting as a functional part of natural systems. Floodplain vegetation and soils act as water filters, intercepting surface water runoff before it reaches lakes, streams, or rivers. This process aids in the removal of excess nutrients, pollutants, and sediments from the water and helps reduce the need for costly cleanups and sediment removal. Floodplains also reduce downstream flooding by increasing upstream storage in wetlands, sloughs, back channels, side channels and former channels.

Flooding on Eglin AFB could occur as a result of rainfall within the base's drainage basins, hurricanes, or a combination of both. Figure A-19, Appendix A, shows the 100-year flood inundation area. The majority of the installation is above the Federal Emergency Management Agency (FEMA) 100-year flood zone; however, extensive flood-prone areas occur along the Yellow River drainage system and the East Bay Swamp. Most of the perennial streams on base are included within areas expected to be inundated by 100-year floods. A description of the types of floodplains found on Eglin is provided in Appendix F. The 100-year floodplain is considered a Wetland Resource Area under the Wetlands Protection Act.

3.8 WATER RESOURCES AND WATER QUALITY

3.8.1 Regulatory Overview

Water resources are protected by a number of federal and state water quality acts, a floodplain management directive, and implementing regulations. Major applicable laws, regulations, orders, and instructions include:

- Safe Drinking Water Act
- Florida Safe Drinking Water Act
- Clean Water Act
- Florida Surface Water Improvement and Management Act (SWIM) of 1987
- Florida Water Quality Assurance Act (1983)
- Florida Administrative Code (FAC) Sections 62-301, Surface Waters of the State and 62-302, Surface Water Quality Standards
- FAC Section 62-550, Drinking Water Standards, Monitoring and Reporting
- Executive Order 11988, Floodplain Management (implemented for the Air Force as part of Air Force Instruction 32-7060)
- Executive Order 11990, Protection of Wetlands
- Air Force Instruction (AFI) 32-7041, Water Quality Compliance.
- Total Maximum Daily Loads Program (TMDLP) and the Florida Watershed Restoration Act (FWRA)
- FAC 62-303, Impaired Waters Rule
- FAC 62-312, Dredge and Fill Activities
- 40 Code of Federal Regulations (CFR) 122.26, Storm Water Discharges
- FAC 62-25 Regulation of Stormwater Discharge

The U.S. Environmental Protection Agency (USEPA) is responsible for implementing regulations for the Safe Drinking Water and Clean Water Acts. The Florida Department of Environmental Protection (FDEP) oversees implementation of state and some federal regulatory requirements including the Florida Safe Drinking Water Act and Florida Administrative Code (FAC) 62-550, Drinking Water Standards Monitoring and Reporting. On Eglin Air Force Base, AFI 32-7041 instructs the Air Force on how to assess, attain, and sustain compliance with the Clean Water Act; other federal, state, and local environmental regulations; and related

Department of Defense (DoD) and Air Force water quality directives. In general these acts and regulations establish a variety of programs to monitor surface water and groundwater quality, identify waters with substandard water quality and the causes of the water quality problems, and implement measures to remediate these problems and minimize future degradation of water quality by human actions. Where applicable, these laws, regulations, orders, and instructions are discussed in the appropriate resource sections.

The Florida Administrative Code Sections 62-301 and 62-302, Surface Waters of the State, identifies certain state waters that have been designated Outstanding Florida Waters (OFWs). The regulatory significance of this designation is that the FDEP cannot allow ambient water quality to significantly decrease through the issuance of permits for direct or indirect pollutant discharge (FDEP, 2002).

Eglin AFB has an existing National Pollutant Discharge Elimination System (NPDES) permit for industrial discharge of storm water, but construction activities greater than five acres in scope that may potentially create erosion would require an additional NPDES construction permit. After March 2003, the regulation will change to require that construction activities greater than one acre in scope have an NPDES construction permit.

3.8.2 Surface Waters

Surface water is any water that lies above groundwater, such as ponds, rivers, streams, and springs or artificial containments. Surface water hydrology on Eglin AFB is directly linked to geology and geomorphology. Lakes, ponds, and wetlands occur where local shallow clay and silt layers restrict the downward movement of water to the regional water table (U.S. Air Force, 1995). The hydrologic characteristics of each drainage basin can be directly related to watershed geology and drainage density.

Eglin AFB encompasses portions of two hydrologic basins as defined by the U.S. Geological Survey (USGS) (FDEP, 2000a): the Choctawhatchee River Basin and the Blackwater-Yellow River Basin. Surface water in these basins is extensive; Eglin AFB includes 32 lakes (over 300 acres of man-made ponds and natural lakes), 30 miles of rivers, an extensive stream network covering approximately 600 acres of the base, and 20 miles of Gulf of Mexico shoreline, and it is adjacent to several estuarine bays along the Gulf of Mexico (Figure A-20, Appendix A) (U.S. Air Force, 2001f). Descriptions of the different aquatic systems found on Eglin are located in Appendix F.

Streamflow remains fairly constant all year in the small streams on mainland Eglin AFB because of a close relationship between groundwater and surface water (U.S. Air Force, 1995). Rainfall rapidly infiltrates the soil profile to recharge the shallow groundwater. The stored groundwater is released slowly to the surface water (Becker et al., 1989). There is an increase in drainage on the Eglin land range from the west to the east that results from higher elevations in the east. Also, there is an increased clay content and hardpan development in the soils and underlying sediments to the east. This produces lower permeability, more surface run-off, and attendant channel development.

On Santa Rosa Island, there are brackish ponds, and many other small wetlands, but no natural surface freshwater bodies. After heavy rainfall, the ponds may become fresh for brief periods. Likewise, no well-developed drainages exist, but numerous coves and inlets may be found along

the northern edge of Santa Rosa Island. Based on topography, surface water either drains into Choctawhatchee Bay or the Gulf of Mexico. Surface water can also pond up in various wetland areas. Some precipitation is lost through the natural hydrologic processes of interception, depression storage, infiltration, evaporation, and transpiration. The remaining precipitation flows overland and through the soil, collects as flow in swales and small channels, and eventually becomes runoff to other bodies of water.

Outstanding Florida Waters (OFWs)

Waters listed as OFWs include surface waters in national parks, aquatic preserves, wildlife refuges, marine sanctuaries, wild and scenic rivers, state aquatic preserves, and waters in areas acquired through donation, trade, or purchase. It is the FDEP’s policy to afford the highest protection to Outstanding Florida Waters. No degradation of water quality, other than that allowed in Rule 62-4.2.4.2(1) and (2), is permitted in these waters. OFWs directly adjacent to Eglin AFB include Fred Gannon Rocky Bayou State Park and Aquatic Preserve and the Yellow River Marsh Aquatic Preserve. Small boat activities would occur in the Yellow River Marsh Aquatic Preserve; no activities would occur in Rocky Bayou. As a water body, Rocky Bayou is a sub-component of Choctawhatchee Bay, within which ARG/MEU activities would occur.

Surface Water Quality

Water quality is a measurement of the chemical and physical characteristics of a water mass that describes its suitability for specific uses. The state of Florida has developed and retains primacy for surface water quality standards for all waters of the state (FAC 62-301 and FAC 62-302) in accordance with the provisions of the Clean Water Act. A scoring system based on the data in the *Florida Water Quality Assessment, 2000 305 (b) Report* is used by FDEP to rate the quality of surface waters of the state. Florida surface waters were rated as follows:

- Fully Meets Use
- Partially Meets Use
- Does Not Meet Use
- Insufficient Data

Based on the above system, the surface water quality of rivers, streams, creeks, bayous, and bays in the Region of Influence was rated by the state. The report delineated large basins and numerous sub-basins for each of the five water districts in the state. Figure A-21, Appendix A, illustrates water quality of sub-basins on the Eglin Complex. Water quality of many of the basins on the Eglin Military Complex has apparently improved, achieving a rating from partially meeting water quality standards in 1996 to fully meeting FDEP water quality standards in 2000. However, water quality data for several sub-basins on the Eglin Military Complex was lacking such that an assessment could not be made for either year.

In general, all the major river/stream mainstems (Yellow River, Turkey Creek, Rocky Creek, Turtle Creek, and Live Oak Creek) were rated as fully meeting water quality standards. Improvements in water quality occurred in Choctawhatchee Bay and in the southern and western portions of the Eglin Military Complex. Several central and eastern sub-basins of the Eglin Military Complex were generally deficient in data necessary for a 305(b) water quality evaluation. Water quality criteria for Class I, II and III waters are presented in Table 3-11.

Table 3-11. Water Quality Criteria for Class I, II, and III Waters

Parameter	Units	Class I	Class II	Class III	
				Fresh	Marine
Turbidity	NTU	≤29 above background	≤29 above background	≤29 above background	≤29 above background
Dissolved Solids	mg/L	≤500 monthly average, ≤1,000 maximum	None	None	None
pH	pH units	No change more than one unit above or below background	No more than one unit change for coastal waters or .2 unit change for open waters	No more than one unit change above or below background	No more than one unit change for coastal waters or .2 unit change for open waters
Chlorides	mg/L	≤250	No increase >10 percent above background	None	No increase >10 percent above background
Fluorides	mg/L	≤1.5	≤1.5	≤10.0	≤5.0
Conductivity	Micromho	No increase above 50 percent of background or 1,275	None	No increase above 50 percent of background or 1,275	None
Dissolved Oxygen	mg/L	Not less than 5.0	Not average less than 5.0 and never be less than 4.0	Not less than 5.0	Not average less than 5.0 and never be less than 4.0
BOD	mg/L	No increase such that DO drops below limit for any class.			
Nutrients: Total Phosphorus, Total Nitrogen		No alteration in nutrients such that an imbalance in natural populations of aquatic flora or fauna results.			
Total Coliform	#/100 ml	≤2,400 in any one sample	No more than 10 percent of samples exceed 230	≤2,400 in any one sample	≤2,400 in any one sample
Fecal Coliform	#/100 ml	≤800 in any one sample	≤800 in any one sample	≤800 in any one sample	≤800 in any one sample
Copper	µg/L	≤(.8545[in hardness] – 1.465)	≤2.9	≤(.8545[in hardness] – 1.465)	≤2.9
Iron	mg/L	≤0.3	≤0.3	≤1.0	≤0.3
Lead	µg/L	(1.273[in hardness] – 4. 705)	≤5.6	(1.273[in hardness] – 4. 705)	≤5.6
Zinc	µg/L	(0.8473[in hardness] + 0.7614)	≤86	(0.8473[in hardness] + 0.7614)	≤86
Mercury	µg/L	≤0.012	≤0.025	≤0.012	≤0.025

Source: FDEP, 2000a

No surface water in the Region of Influence is currently defined as Class I (potable water supply). A portion of Choctawhatchee Bay and its tributaries, East Bay and its tributaries, and the Santa Rosa Sound are delineated as Class II (shellfish propagation or harvesting). The remaining streams on the reservation and marine waters seaward of Santa Rosa Island are defined as Class III (recreation, propagation, and maintenance of a healthy, well-balanced population of fish and wildlife) (FDEP, 2000a).

Overall water quality in Choctawhatchee Bay is reported to be good, as defined by a Florida Department of Environmental Protection (FDEP) water quality index (Hand et al., 1994). The FDEP rates water quality in Santa Rosa Sound as "good" with little change over the last 10 years (FDEP, 2000a). Most of the waters in the Sound are Class II waters, approved for shellfish harvesting (Florida Department of Agriculture, 2001). East Bay and Blackwater Bay are part of the Pensacola Bay system, which due to decreasing water and sediment quality and loss of habitat was designated a priority Surface Water Improvement and Management water body in the 1980s (FDNR, 1991). East Bay rated "good" during the 1980s and 1990s and showed a trend toward improving water quality. East Bay is a Class II water.

3.8.3 Groundwater

The two aquifers located under Eglin are the Sand and Gravel Aquifer and the Floridan Aquifer. Eglin uses only a small amount of water from the Sand and Gravel Aquifer; however, the Floridan Aquifer is used extensively. The Floridan Aquifer is located below the Sand and Gravel Aquifer and extends beneath most of Florida.

Sand and Gravel Aquifer

The Sand and Gravel Aquifer consists of the Citronelle formation and marine terrace deposits that reach a maximum thickness of 1,200 feet at Mobile Bay, Alabama (U.S. Air Force, 1995). Although the aquifer is composed of clean, fine-to-coarse sand and gravel, locally it contains some silt, silty clay, and peat beds. The Sand and Gravel Aquifer is segregated from the underlying limestone of the Floridan Aquifer by the Pensacola Clay confining bed. Water in the Sand and Gravel Aquifer exists in generally unconfined (free water surface or water table conditions) and confined (under pressure) conditions (Becker et al., 1989). It is vulnerable to contamination from surface pollutants (Becker et al., 1989; U.S. Air Force, 1995). Pollutants enter the Sand and Gravel Aquifer by percolating downward through the sandy soils. They then migrate laterally in the groundwater and enter surface waters through base flow that provides most of the water to area streams and creeks. Wildlife habitat and vegetation provided by the streams are affected by the pollutants in the surface water (U.S. Air Force, 1995).

Where the aquifer is in direct contact with surface water, such as a stream or Choctawhatchee Bay, water table conditions occur (Becker et al., 1989). The water table is at or within a few feet of land surface in the Coastal Lowlands region. The water table occurs at considerable depth below the land surface in the Western Highlands (U.S. Air Force, 1995). Lakes and ponds occur where local shallow clay and silt layers restrict the downward movement of water to the regional water table (U.S. Air Force, 1995).

The quality of water in the aquifer has been rated good (i.e., meets its intended use) by the Florida Department of Environmental Protection (U.S. Air Force, 1995). Water from this aquifer

is not a primary source of domestic or public supply water on Eglin because of the large quantities of higher quality water available from the underlying Upper Limestone of the Floridan Aquifer (Becker et al., 1989; U.S. Air Force, 1995).

Floridan Aquifer

The Floridan Aquifer, Eglin's sole drinking water source, consists of a thick sequence of interbedded limestone and dolomites. Throughout the Eglin reservation, the Floridan Aquifer exists under confined conditions, bounded above and below by the Pensacola Clay confining bed. This clay layer restricts the downward migration of pollutants and restricts saline water from Choctawhatchee Bay and the Gulf of Mexico from entering the Upper Limestone layer of the aquifer. The clay layer of the Bucatunna Formation separates the Upper and Lower Limestone units. Because it is saline, the Lower Limestone unit is not used as a water source (U.S. Air Force, 1995). Groundwater storage and movement in the Upper Limestone layer occurs in interconnected, intergranular pore spaces, small solution fissures, and larger solution channels and cavities. Water quality for raw water drawn from the upper limestone of the Floridan aquifer is of suitable quality for most uses.

Groundwater contamination

Contamination of the Sand and Gravel Aquifer has occurred through past base-related activities. Several base Installation Restoration Program (IRP) sites report various amounts of pesticides, heavy metals, petroleum hydrocarbons, and other compounds throughout the Eglin land test areas (U.S. Air Force, 1995). Figures A-67 through A-70, Appendix A, show IRP sites on Eglin. Additional information on IRP sites is available in the Hazardous Materials/Solid Waste Section.

3.9 AIR QUALITY

Air quality in a given location is described by the concentration of various pollutants in the atmosphere, generally expressed in units of parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). Air quality is determined by the type and amount of pollutants emitted into the atmosphere, the size and topography of the air basin, and the prevailing meteorological conditions.

Pollutant concentrations are compared to federal and state ambient air quality standards to determine potential effects. These standards represent the maximum allowable atmospheric concentration that may occur and still protect public health and welfare, with a reasonable margin of safety. The national ambient air quality standards (NAAQS) are established by the Environmental Protection Agency (USEPA). In order to protect public health and welfare, the USEPA has developed numerical concentration-based standards or NAAQS for six "criteria" pollutants (based on health related criteria) under the provisions of the Clean Air Act Amendments of 1970 (CAA). There are two kinds of NAAQS: primary and secondary standards. Primary standards prescribe the maximum permissible concentration in the ambient air to protect public health including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards prescribe the maximum concentration or level of air quality required to protect public welfare including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.

National ambient air quality standards have been established for: 1) ozone (O_3), 2) nitrogen dioxide (NO_2), 3) carbon monoxide (CO), 4) sulfur oxides (SO_2), 5) lead (Pb), 6) particulate matter with an aerodynamic diameter less than or equal to 10 microns (PM_{10}), and particulate matter with an aerodynamic diameter less than or equal to 2.5 microns ($PM_{2.5}$). The NAAQS are the cornerstone of the CAA. Although not directly enforceable, they are the benchmark for the establishment of emission limitations by the states for the pollutants that USEPA determines may endanger public health or welfare. Florida has adopted the NAAQS except for sulfur dioxide (SO_2). USEPA has set the annual and 24-hour standards for SO_2 at 0.03 ppm (80 µg/m^3) and 0.14 ppm (365 µg/m^3) respectively. Florida has adopted the more stringent annual and 24-hour standards of 0.02 ppm (60 µg/m^3) and 0.01 ppm (260 µg/m^3) respectively. In addition, Florida has adopted the national secondary standard of 0.50 ppm (1,300 µg/m^3). Federal and state ambient air quality standards are presented in Table 3-12.

Table 3-12. National and State Ambient Air Quality Standards

Criteria Pollutant	Averaging Time	Federal Primary NAAQS[1,2,3]	Federal Secondary NAAQS[1,2,4]	Florida Standards
Carbon Monoxide (CO)	8-hour 1-hour	9 ppm (10 µg/m^3) 35 ppm (10 µg/m^3)	No standard No standard	9 ppm (10 µg/m^3) 35 ppm (40 µg/m^3)
Lead (Pb)	Quarterly	1.5 µg/m^3	1.5 µg/m^3	1.5 µg/m^3
Nitrogen Dioxide (NO_2)	Annual	0.053 ppm (100 µg/m^3)	0.053 ppm (100 µg/m^3)	0.053 ppm (100 µg/m^3)
Ozone (O_3)	1-hour[5] 8-hour[6]	0.12 ppm (235 µg/m^3) 0.08 ppm (157 µg/m^3)	0.12 ppm (235 µg/m^3) 0.08 ppm (157 µg/m^3)	0.12 ppm (235 µg/m^3) 0.08 ppm (157 µg/m^3)
Particulate Matter $\leq$10 Micrometers (PM_{10})	Annual 24-hour[7]	50 µg/m^3 150 µg/m^3	50 µg/m^3 150 µg/m^3	50 µg/m^3 150 µg/m^3
Particulate Matter $\leq$2.5 Micrometers ($PM_{2.5}$)	Annual 24-hour[8]	15 µg/m^3 65 µg/m^3	15 µg/m^3 65 µg/m^3	15 µg/m^3 65 µg/m^3
Sulfur Dioxide (SO_2)	Annual 24-hour 3-hour	0.03 ppm (80 µg/m^3) 0.14 ppm (365 µg/m^3) No standard	No standard No standard 0.50 ppm (1300 µg/m^3)	0.02 ppm (60 µg/m^3) 0.10 ppm (260 µg/m^3) 0.50 ppm (1300 µg/m^3)

Source: FDEP, 2000; USEPA, 2003 (web site: www.epa.gov/airs/criteria.html)

1. National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above the standard is equal to or less than 1. The EPA has been given the authority by the federal courts to proceed with the implementation of the new 8-hour ozone standard and the PM 2.5 standard; however, they have not been implemented at this point and are included for information only.
2. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 mm of mercury; ppm refers to parts per million by volume.
3. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.
4. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
5. The ozone one-hour standard still applies to areas that were designated nonattainment when the ozone eight-hour standard was adopted in July 1997.
6. The ozone eight-hour standard is attained when the fourth highest eight-hour concentration in a year, averaged over three years, is equal to or less than the standard.
7. The PM_{10} 24-hour standard is attained when 99 percent of the daily concentrations, averaged over three years, are equal to or less than the standard.
8. The $PM_{2.5}$ 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard.

The fundamental method by which the USEPA tracks compliance with the NAAQS is the designation of a particular region as “attainment,” “nonattainment,” or “unclassifiable.” Areas meeting or having better air quality than the NAAQS are said to be in attainment. Areas that exceed the NAAQS are said to be in nonattainment. Areas that cannot be classified on the basis of available information as attainment or nonattainment are defined as unclassifiable and are treated as attainment areas. Attainment areas can be further classified as maintenance areas. Maintenance areas are areas that were previously nonattainment but have reduced pollutant concentrations below the standard and must maintain some of the nonattainment area plans to stay in compliance.

All project activities, except for operations in the Gulf of Mexico, occur in the Mobile (Alabama)–Pensacola–Panama City (Florida)–Southern Mississippi Interstate Air Quality Control Region (federal AQCR #5). In Florida, AQCR #5 consists of the territorial area encompassed by the boundaries of the following jurisdictions: Escambia County, Santa Rosa County, Okaloosa County, Walton County, Holmes County, Washington County, Bay County, Jackson County, Calhoun County, and Gulf County.

As noted above, Eglin AFB is located in AQCR 5. The USEPA has classified the Florida counties in this AQCR as attainment for all criteria pollutants (40 CFR 81.310).

Over the past few years, ground-level ozone has become a problem along the Gulf Coast. Indications are that the prevailing wind patterns (land/sea breeze cycle) may be keeping pollutants (generated locally and transported into the area from out of the region) over the Florida Panhandle. Eight-hour ozone monitors have been operated in Pensacola (3) since 1999 and Navarre (1) and Panama City (1) since 2000. All monitoring stations in Pensacola, Navarre, and Panama City have three complete years of data (2000–2002) – the monitoring period needed to make an attainment/nonattainment designation. An exceedence of the standard was recorded in all three cities during 2000, but none have been recorded since. The three-year average for all locations is below the 8-hour standard of 85 parts per billion; therefore, all areas remain in attainment.

The new federal 8-hour standard for ozone has been established at a level equivalent to 85 parts per billion averaged over any 8-hour period. An area will be considered as nonattainment (not meeting the standard) if the average of the annual fourth highest ozone readings at any ozone monitor for any three year period equals or exceeds 85 parts per billion.

It should also be noted that sources located within 25 miles of the state’s seaward boundary are subject to federal and state air quality-related requirements as if they were located in the corresponding onshore area. Such requirements include, but are not limited to, state and local requirements for emission controls, emission limitations, offsets, permitting, monitoring, testing, and reporting. Before any agency, department, or instrumentality of the Federal government engages in, supports in any way, provides financial assistance for, licenses, permits, or approves any activity, that agency has the affirmative responsibility to ensure that such action conforms to the state implementation plan for the attainment and maintenance of the NAAQS.

Identifying the affected area for an air quality assessment requires knowledge of pollutant types, source emissions rates and release parameters, proximity relationships of project emission sources to other emissions sources, and local and regional meteorological conditions. The

affected area for emissions of O_3 precursors (volatile organic compounds [VOC] and nitrogen oxides [NO_X]) from the project would be the air shed (AQCR #5) surrounding Eglin AFB. However, because of the large size of the air quality control region, the affected area for O_3 and its precursors for this analysis is defined as Santa Rosa, Okaloosa, and Walton counties. Therefore, site-related emissions of VOCs and NO_x are compared to emissions inventory generated within these counties. The affected area for the inert pollutants (CO, SO_2, Pb, PM_{10}) that do not undergo a chemical reaction in the atmosphere is limited to the immediate vicinity of the particular activity and is also compared to the Santa Rosa, Okaloosa, and Walton Counties' portion of the AQCR emissions inventory as a means of assessing potential changes in air quality.

An air emissions inventory is an effort to qualitatively and quantitatively describe the amount of emissions from a facility or within an area. Inventories are designed to locate pollution sources, define the type and size of sources, define and characterize emissions from each source, determine relative contributions to air pollution problems by classes of sources and by individual sources, and determine the adequacy of regulations. The air emissions inventory is an estimate of total mass emissions of pollutants generated from a source or sources over a period of time, normally a year. Accurate inventories are needed for estimating the interrelationship between emissions sources and air quality and for determining whether an emission source requires an operating permit based on actual emissions or the potential to emit.

The latest air emissions inventories for Eglin AFB quantifies emissions from mobile sources based on 2000 calendar year activity (U.S. Air Force, 2001) and stationary sources based on 2000 calendar year activity (U.S. Air Force, 2001a). The most recent county inventories quantify emissions from stationary and mobile sources based on 2000 calendar year activity (Zhu, 2002). The 2000 air emissions inventory provides actual emissions from all identified sources.

The most current emissions inventories for Eglin AFB and Santa Rosa, Okaloosa, and Walton counties are presented in Table 3-13. All inventories include mobile (aircraft, on-road vehicles, off-road vehicles, etc.) sources.

Table 3-13. Baseline Emissions Inventory (Tons)

Pollutant Emission Source	Pollutants (tons/year)				
	CO	NO_X	PM_{10}	SO_X	VOCs
Eglin AFB Stationary Emissions (CY2000)	95	118	115	17	106
Eglin AFB Mobile Source Emissions (CY2000)	14,429	56,000	4,233	10,538	3,924
Eglin AFB Totals	**14,524**	**56,118**	**4,348**	**10,555**	**4,030**
Santa Rosa County (CY2000)*	34,438	10,611	516	3,952	4,629
Okaloosa County (CY2000)*	91,361	8,709	3,930	406	11,958
Walton County Total Emissions (CY2000)*	23,553	2,972	172	162	2,913
County Totals	**149,352**	**22,292**	**4,618**	**4,520**	**19,500**

Source: U.S. Air Force, 2001; U.S. Air Force, 2001a; Zhu, 2002
*Includes mobile sources

3.10 HAZARDOUS MATERIALS/SOLID WASTE

According to the Resource Conservation and Recovery Act (RCRA), Section 6903(5), hazardous materials and waste are defined as substances that, because of "quantity, concentration, or physical, chemical, or infectious characteristics may cause or significantly contribute to increases in mortality or serious illnesses, or pose a substantial threat to human health or the environment." Hazardous materials as referenced here pertain to mission related hazardous chemicals or substances meeting the requirements found in 40 CFR 261.21.24, are regulated under RCRA, and are guided by AFI 32-7042. The hazardous materials to be transported, stored and used on site for the Proposed Action consist of fuels, munitions, and pyrotechnics.

Under federal law, the transportation of hazardous materials is regulated in accordance with the Hazardous Materials Transportation Act, 49 U.S.C. 1801 et seq. For the transportation of hazardous materials, Florida has adopted federal regulations that implement the Hazardous Materials Transportation Act, found at 49 CFR 178.

State laws pertaining to hazardous materials management include the Florida Right-to-Know Act, Florida Statutes Title 17, Chapter 252, the Hazardous Waste section of the Florida Department of Environmental Protection (FDEP) and the Florida Department of Transportation (FDOT) Motor Carrier Compliance Department that implements 49 CFR 178 under Florida statute annotated Title 29 Section 403.721.

AAC Plan 32-9, Hazardous Materials Management, describes how Eglin complies with federal, state, Air Force and DoD laws and instructions. All Eglin AFB organizations and tenants are required to follow this plan.

3.10.1 Debris

Debris includes the physical materials that are deposited on the surface of terrestrial or aquatic environments during mission activities. The potential impacts are primarily related to physical disturbances to people, wildlife, or other users of the range, and chemical alterations that could result from the residual materials. Examples of debris deposited from activities that may potentially result in environmental impacts include the following:

- Shell casings, canisters from signal smokes, flares, chutes from flares
- UXO (primarily inert items)
- Litter and refuse from daily mission activities including ground troop movement

3.10.2 Chemical Materials

Chemical materials encompass liquid, solid, or gaseous substances that are released to the environment as a result of mission activities. These would include munitions and pyrotechnic combustion by-products, residual fuel leaks or spills, and untreated bilge release. Release of these materials may potentially affect air quality, water quality, soils, and sediments. The environmental analysis of chemical materials describes the potentially adverse environmental impacts from MEU training activities.

Installation Restoration Program (IRP)

The Installation Restoration Program (IRP) is used by the Air Force to identify, characterize, and remediate past environmental contamination on Air Force installations. Although widely accepted at one time, the procedures followed for managing and disposing of wastes resulted in contamination of the environment. The IRP has established a process to evaluate past disposal sites, control the migration of contaminants, identify potential hazards to human health and the environment, and remediate the sites. Regulations affecting IRP management at Eglin integrate investigative and remedial protocols of the CERCLA and RCRA processes, as well as state environmental compliance programs, primarily those found in the Florida Administrative Code (FAC) 62-770, Petroleum Contamination Site Cleanup Criteria. IRP sites on Eglin AFB are detailed in the *Installation Restoration Program Management Plan* (U.S. Air Force, 2000c). Insertion and objective areas will be evaluated for potential IRP site locations, which are provided in Figures A-67 to A-70, Appendix A.

3.11 SENSITIVE SPECIES

Sensitive species include those with federal endangered or threatened status, federal candidate species, and state endangered, threatened, and species of special concern status (U.S. Air Force, 1995). An endangered species is one that is in danger of extinction throughout all or a significant portion of its range. A threatened species is any species that is likely to become endangered in the future throughout all or a significant portion of its range due to loss of habitat, anthropogenic effects, or other causes. Federal candidate species and all state listed species are those that should be given consideration during planning of projects, but have no protection under the Endangered Species Act. Marine mammals, which are protected under the Marine Mammal Protection Act, are also addressed in this section.

Eglin Natural Resources Branch (EMSN) protects state listed species through habitat management, specifically through the management of habitats identified as conservation targets by the Nature Conservancy. By addressing the needs of conservation targets, which are sensitive, essential habitat and cornerstone species, EMSN indirectly supports the management of other species and habitat, including state listed species.

3.11.1 Aquatic Species

Atlantic Loggerhead Sea Turtle (*Caretta caretta*)

The loggerhead turtle (*Caretta caretta*), federally and state listed as threatened, gained its status on July 28, 1978. Loggerhead nests in Florida account for 90 percent of all loggerhead nests in the United States. From March through June, adult loggerheads congregate in the nearshore and offshore waters of the Gulf of Mexico to mate. Their nesting sites are on the numerous barrier islands and beaches between the Florida Keys and the northern Gulf of Mexico. Nesting females approach Santa Rosa Island in the spring and summer to dig their nests between the high tide mark and the dune line and sometimes between dunes. A more detailed explanation of loggerhead nesting and hatching activity on Santa Rosa Island is provided in Chapter 4. These turtles are the most commonly seen sea turtles in the southeastern United States and may be found near underwater structures and reefs (USFWS, 1996). It was concluded (NMFS and

USFWS, 1991) that the loggerhead turtle population is continuing to decline in the southeastern United States, and shrimping is thought to have played a significant role in this decline (USFWS, 1996). The diet of loggerheads consists of gastropods, mollusks, coelenterates, and cephalopods (NMFS and USFWS, 1991).

Genetic research has identified four loggerhead nesting subpopulations in the western North Atlantic: 1) the Northern Subpopulation, occurring from North Carolina to around Cape Canaveral, Florida; 2) South Florida Subpopulation, occurring from Cape Canaveral on Florida's east coast to Sarasota on Florida's west coast; 3) Northwest Florida Subpopulation, occurring at Eglin Air Force Base and the beaches near Panama City; and 4) Yucatán Subpopulation, occurring on the eastern Yucatán Peninsula, Mexico (Bowen, 1995; Bowen et al., 1993; Encalada et al., 1998). These data indicate that gene flow between these four regions is very low. If nesting females are extirpated from one of these regions, regional dispersal will not be sufficient to replenish the depleted nesting subpopulation.

Atlantic Green Sea Turtle (*Chelonia mydas*)

The green sea turtle (*Chelonia mydas*) was listed as federally threatened on July 28, 1978, in all its eastern range of North America, except in Florida where it is listed as endangered. It is also listed as endangered by the State. In the United States, it nests on southern Florida beaches with a few exceptions in the northern Gulf of Mexico and North Carolina (USFWS, 1996). The officially recognized nesting and hatching season for the green sea turtle extends from May 1 through October 31 in Florida's panhandle. Nesting in the panhandle, however, has been consistently documented as an every other year event since 1990, with incubation periods ranging from 60 to 90 days. Eglin AFB Santa Rosa Island property supports the highest number of green sea turtle nests in northwest Florida. A more detailed explanation of green turtle nesting and hatching activity on Santa Rosa Island is provided in Chapter 4. Primarily a tropical herbivore, the juveniles are frequently found in the Gulf of Mexico in areas where there is an abundance of seagrass (USFWS, 1996).

Leatherback Sea Turtle (*Dermochelys coriacea*)

The leatherback sea turtle (*Dermochelys coriacea*) was originally listed as federally endangered on June 2, 1970, and is considered a State endangered species also. This species commonly nests along the shorelines of the Atlantic, Pacific, and Indian Oceans. Only infrequent nesting activity has been documented for the leatherback in northwest Florida (LeBuff, 1976; FWC FMRI, unpublished data; Longieliere et al., 1997). The officially recognized nesting and hatching season for the leatherback extends from March 1 through September 30, with nest incubation ranging from 60 to 75 days (FWC FMRI unpublished data; Longieliere et al., 1997; FWC FMRI, 1998). Until the spring of 2000, the only confirmed leatherback nestings in northwest Florida were in Franklin and Gulf counties. In May and June 2000, leatherback nesting activity was documented for the first time in Okaloosa County on Eglin's portion of Santa Rosa Island (Miller, personal communication, 2000). A more detailed explanation of leatherback nesting and hatching activity on Santa Rosa Island is provided in Chapter 4. The leatherback feeds primarily on jellyfish, but occasionally will eat sea urchins, squid, crustaceans, tunicates, fish, blue-green algae, and floating seaweed (USFWS, 1996).

Kemp's Ridley Sea Turtle (*Lepidochelys kempii*)

The Kemp's ridley (*Lepidochelys kempii*) turtle received the status of federally endangered, under the Endangered Species Act (ESA), throughout its range on December 2, 1970. Adults have the most restricted distribution of any sea turtle and are usually confined to the Gulf of Mexico, while postpelagic turtles may be found over crab-rich sandy or muddy bottoms. As hatchlings, the species presumably eat *Sargassum* (a floating seaweed) and small organisms associated with the floating *Sargassum*. Adults feed mainly on crabs (USFWS and NMFS, 1992).

Hawksbill Sea Turtle (*Eretmochelys imbricata*)

The hawksbill sea turtle (*Eretmochelys imbricata*) was originally listed as federally endangered on June 2, 1970. It remains endangered as listed by the state of Florida and USFWS under the ESA (USFWS 1990; NMFS and USFWS 1995; USFWS 1996). Severe population declines have occurred throughout the western Atlantic and Caribbean. Continued illegal international trade in tortoise shell and use of hawksbill meat and eggs are a major threat to the turtles' survival. Though rare in northeastern Gulf waters, nesting for the hawksbill turtle has been reported along the Gulf coast and is seen with some regularity in the waters near the Florida Keys (MMS 1986; NMFS and USFWS, 1993). Although mostly a spongivore, this species feeds on other invertebrates that encrust coral reefs (USFWS, 1990). Commercial exploitation is the major cause of the continued decline of the species (USFWS, 1996).

Gulf Sturgeon (*Acipenser oxyrinchus desotoi)*

The USFWS and NMFS designated the Gulf sturgeon (*Acipenser oxyrinchus desotoi)* as federally threatened under the ESA in 1991. The sturgeon is also considered a state listed species of special concern. The Gulf sturgeon occurs predominately in the northeastern Gulf of Mexico, inhabiting offshore areas and inland bays during the winter months and moving into freshwater rivers during the spring to spawn (USFWS and GSMFC, 1995). Migration into fresh water generally occurs from March to May, while migration into salt water occurs from October through November. Within the region of influence, sturgeon occur in the Yellow River in the spring and summer and in Choctawhatchee Bay, Santa Rosa Sound, and the Gulf of Mexico in the winter. Little is known about the offshore distance the Gulf sturgeon travels, but analyses of stomach contents suggest that feeding occurs as far as 20 miles offshore (Page and Burr, 1991; U.S. Coast Guard, 1996).

Tracked Gulf sturgeon were found to be distributed nonrandomly within Choctawhatchee Bay in nearshore areas 2 to 4 meters deep, with a home range usually no more than 1 square kilometer. Occasionally, the sturgeon would travel further distances but generally remained in areas of sandy bottom sediments that contained an abundance of amphipod crustaceans and polychaete worms (Fox et al., 2000). Sturgeon were generally not found in seagrass beds. Distribution and area/habitat preference in Choctawhatchee Bay may be related to sturgeon age. Subadult sturgeon are located frequently in LaGrange and Alaqua Bayous, while adults seem to prefer Hogtown Bayou. Areas east of the Highway 331 Bridge are generally not used as winter habitat (USFWS, 2001a, pers. comm.). Sturgeon have been found on both sides of the Mid-Bay Bridge, but decrease in occurrence west to Fort Walton Beach.

Research on Gulf sturgeon in the Yellow River, supported in part by Eglin AFB, suggests that certain areas of the Yellow River may be potential summer refuge areas for sturgeon (Craft et al., 2001). Adult sturgeon have been found to congregate in relatively high numbers in these summer refuge areas, though their distribution is spread over the entire length of the Yellow River. Generally, the summer refuge areas are located in the southern part of the Yellow River adjacent to Eglin property. Heavy sediment loads and low water volume from drought conditions were identified as factors potentially affecting sturgeon migration in the Yellow River. Due to the low number of sturgeon observed in East Bay during the winter, Craft et al. (2001) theorize that the majority of sturgeon in that region migrate to the Gulf of Mexico during the winter months.

Gulf sturgeon feed on insects, crustaceans, mollusks, worms, and small fish (U.S. Coast Guard, 1996; Page and Burr, 1991). Ghost shrimp are thought to be an important prey item for adult sturgeon. Bottom disturbing activities could significantly impact the Gulf sturgeon (USFWS, 2001a, pers. comm.).

Under the ESA, USFWS is to designate critical habitat for each listed species. Critical habitat is defined by the ESA as specific areas within or outside the geographical area occupied by the species that contain physical or biological features essential to the species' conservation, and that may require special management considerations or protection. The proposed rule for Gulf sturgeon critical habitat was published in the *Federal Register* in June 2002, but a final determination has not been made. In the area of interest, all of Choctawhatchee Bay, East Bay, Santa Rosa Sound, and the Yellow River are proposed as critical habitat.

Okaloosa Darter (*Etheostoma okaloosae*)

The Okaloosa darter is found in six small Choctawhatchee Bay Basin tributaries located in the Sandhills ecological association of the Eglin Mainland Reservation (shown in Figures A-20 and A-38, Appendix A). The darter's diet consists primarily of immature aquatic insect larvae. Spawning occurs from March to October, with the greatest amount of activity taking place during April. The spawning occurs in beds of clean, current swept macrophytes (large aquatic plants). Okaloosa darter habitat is sensitive to a variety of disturbances. Erosion can increase siltation and imperil the darter's habitat. Its range has also been reduced by habitat modification and encroachment by the brown darter. In order to protect the Okaloosa darter, the quantity and quality of water in the streams must be protected (USFWS, 1998).

Marine Mammals

Two marine mammal species occur in the Gulf of Mexico in the area of ARG/MEU operations, East Bay, Choctawhatchee Bay, and Santa Rosa Sound. The bottlenose dolphin (*Tursiops truncatus*) occurs year-round, and the endangered West Indian manatee (*Trichechus manatus*) is sighted on rare occasions. Bottlenose dolphins are thought to form discrete communities in Gulf of Mexico estuaries and are afforded protection under the Marine Mammal Protection Act (MMPA) (Waring et al., 1999). Based on aerial surveys, the National Marine Fisheries Service estimated Choctawhatchee Bay bottlenose dolphin abundance at 242, which is approximately .58 to 0.74 dolphins per square kilometer. Bottlenose dolphin density estimates derived from aerial surveys during the GulfCet II surveys for the offshore area in the Gulf of Mexico are 0.31 animals per square mile (Davis et al, 2000). The diet of Atlantic bottlenose dolphins consists

mainly of fish, crabs, squid, and shrimp (Caldwell and Caldwell, 1983). Bottlenose dolphins usually occur in groups of 5 to 10 individuals. Manatees occur infrequently in the north Florida panhandle with occasional sightings documented in the news media. Winters in north Florida prevent the cold-sensitive manatees from occurring year-round. Their occasional presence is most probably a result of chance migration from warmer regions. Manatees are protected under the ESA as well as the MMPA.

3.11.2 Terrestrial Species

Red-Cockaded Woodpecker *(Picoides borealis)*

The red-cockaded woodpecker (RCW), a federally endangered and state threatened species, inhabits the interstitial areas of the Eglin reservation (Figures A-38 and A-45, Appendix A). On Eglin, the RCW typically inhabits mature, open stands of longleaf pine. The RCW does not migrate and maintains year-round territories near nesting and roosting trees (Hooper et al., 1980). Studies by DeLotelle et al. (1987) in central Florida found that RCWs foraged primarily in longleaf pine and pond cypress stands with dense ground cover of broomsedge bluestem (*Andropogon virginicus*).

The woodpeckers primarily feed on spiders, ants, cockroaches, centipedes, and insect eggs and larvae that are excavated from trees. Dead, dying, and lightning-damaged trees that are infested with insects are a preferred feeding source. The birds also feed on the fruits of black cherry (*Prunus serotina*), southern bayberry (*Myrica cerifera*), and black tupelo (*Nyssa sylvatica*) (Baker, 1974).

High quality RCW forage habitat consists of open pine stands with tree dbh (diameter at breast height) averaging 9 inches and larger. While 100 acres of mature pine is sufficient for some groups, clans commonly forage over several hundred acres where habitat conditions are not ideal (Jackson et al., 1979). The greatest threat to the RCW populations is loss and fragmentation of their habitat. As a result of active management, RCW populations on Eglin have continued to increase with the number of active clusters growing from an estimated 217 in 1994 to 309 in 2002 (Moranz and Hardesty, 1998; Miller, 2003).

An RCW cluster typically encompasses about 10 acres with the majority of cavity trees most likely within a 1,500-foot diameter circle. The RCW has shown some preference for mature longleaf pine over other pine species as a cavity tree with the average age of longleaf pines in which new cavities have been excavated being 95 years. Cavity excavation may take several years and may be utilized by generations of birds for more than 50 years (Jackson et al., 1979).

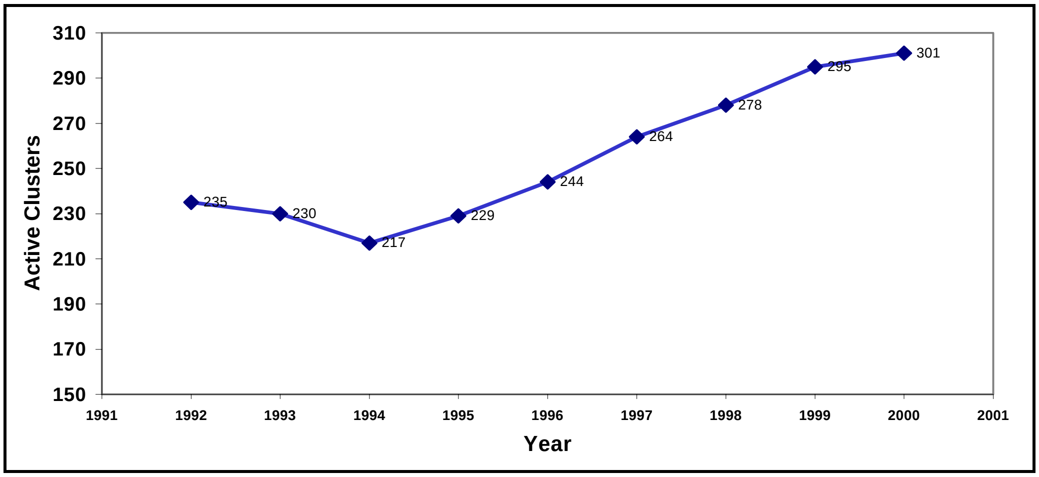

Figure 3-1. Eglin RCW Population Trend

Flatwoods Salamander (*Ambystoma cingulatum*)

The flatwoods salamander is a small mole salamander about 5 inches in length when fully mature (*Federal Register*, 1 April 1999). Habitat for the flatwoods salamander consists mainly of open, mesic (moderate moisture) woodland of longleaf/slash pine flatwoods maintained by frequent fires. Adult flatwoods salamanders breed during the rainy season from October to December (Palis, 1997). Their breeding sites are isolated flatwoods depressions that dry completely on a cyclic basis and are generally shallow and relatively small. Known locations of flatwoods salamander breeding sites are shown in Figures A-41 through A-47 in Appendix A. Since the salamander may disperse over long distances to and from breeding sites to upland sites where they live as adults, desiccation (drying out) can be a limiting factor in their movements. As a result, it is important that areas connecting their wetland and terrestrial habitats are protected to provide cover and appropriate moisture regimes during their migration.

Florida Perforate Lichen (*Cladonia perforata*)

Florida perforate lichen is state and federally listed as endangered. Extensive searches have shown this species to be extremely rare (only 12 documented sites). Many of these sites are threatened by habitat destruction due to development, agricultural operations, and recreational activities. Three of the known populations occur on Eglin AFB Santa Rosa Island (SRI) property. In 1995, Hurricane Opal destroyed two of these populations and reduced the remaining by more than 70 percent (Yahr, 2001). This reduced population persists just east of the Destin pass. In an attempt to limit impact from recreational foot-traffic, Eglin AFB Natural Resources Branch installed 2.5 miles of fencing around the perimeter of suitable habitat.

In June 2000, two reintroduction populations were established in the area of the lost populations, near test site A-10 on the north side of SRI. Recently collected monitoring data collected indicate that the populations are stable with minimal dispersal (Yahr, 2002). MEU activities, including vehicular and troop movements, are proposed for an area less than 1 mile west of reintroduction sites.

Piping Plover (*Charadrius melodus*)

The piping plover is state and federally listed as endangered. Piping plovers are found in wintering habitats as early as mid-July and will leave by early March (USFWS, 2001). This birds' primary winter range is along the Atlantic and Gulf coasts from North Carolina to Mexico and into the Bahamas and West Indies (U.S. Fish and Wildlife Service, 1988, 1989, and 1989a as cited in U.S. Fish and Wildlife Service, 1996). Piping plovers are commonly documented during winter in the Florida panhandle with highest numbers of birds occurring in Franklin, Gulf, and Bay counties. Even though Florida has not been considered a primary wintering area for piping plover, diminishing habitat along other Gulf coast areas may be affording the piping plover new wintering grounds in Florida. These wintering grounds are still considered less suitable, thus forcing the piping plover to utilize isolated patches. As a result, critical habitat has been designated for piping plovers along the Gulf coast of Florida, a portion of which covers SRI (Figure A-39).

Piping plovers can be expected to leave northern breeding grounds and arrive in wintering habitat as early as mid-July, and return north again to breed in March (USFWS, 2001c). Eglin AFB Natural Resources Branch and volunteer personnel have periodically conducted shorebird surveys on SRI during the wintering season. These surveys included participation in International Piping Plover Census in January of 1991, 1996, and 2001. Piping plovers were not sighted on Eglin's property during any of these official surveys. During the 2001 survey, the closest sighting occurred at Navarre Beach State Park and Big Sabine Point (Ferland and Haig, 2001). Volunteers from the Choctawhatchee Audubon Society have conducted periodic shorebird surveys on SRI during which six piping plovers were documented foraging within the designated critical habitat. Two shorebird surveys were conducted during January and February of 2003, and no piping plovers were sighted on SRI (Fenimore, 2003).

Although only a small section of SRI/OI has been designated as critical habitat (see *Critical Habitat* discussion in Section 3.12), piping plovers may be found any place that affords proper foraging and sheltering resources. Piping plovers are known to forage in exposed wet sand areas such as wash zones, intertidal ocean beachfronts, wrack lines, washover passes, mud and sand flats, ephemeral ponds, and salt marshes. They are also known to use adjacent areas for sheltering in dunes, debris, and sparse vegetation. All of these habitat types can be found on Eglin's portion of Santa Rosa Island/Okaloosa Island (SRI/OI). Although it is possible that piping plovers could use any one of these habitat types at any time during the wintering season, studies have shown that wintering plovers spend 76 percent of their time foraging for invertebrates found just below the surface of wet sand (Johnson and Baldassarre, 1988). Therefore, during the wintering season, MEU operative elements are more likely to encounter piping plovers in shoreline areas as opposed to inland movement corridors.

Piping plovers have only been documented using critical habitat areas on the north shore of SRI. However research indicates that patterns of piping plover habitat usage can be very complex. Plovers could feasibly use several locations on the island for foraging, roosting, or sheltering at any time, day or night. Therefore, if the Proposed Action takes place during the piping plover wintering season (mid-July through early-March), it is possible that piping plovers may be present in the action area.

Wintering critical habitat for the piping plover was designated on July 10, 2001 (66 *Federal Register* 36038). *Critical habitat* is a term that refers to specific geographic areas that contain the essential habitat features necessary for the conservation of threatened and/or endangered species. These essential habitat features are found in coastal areas that support intertidal beaches and flats (between annual low tide and annual high tide) and associated dune systems and flats above annual high tide. At the time of designation, the critical habitat areas do not necessarily have to be occupied by piping plovers. Critical habitat areas may require special protection or management considerations for current populations as well as potential population increases necessary to achieve species recovery.

Santa Rosa Beach Mouse (*Peromyscus polionotus leucocephalus*)

The Santa Rosa beach mouse is one of five beach mouse subspecies and is the only subspecies not currently listed by either the state or the federal government. However it may be considered for federal listing in the near future. This population, which occurs only on Santa Rosa Island, was decimated after storm surge from Hurricane Opal in 1995 destroyed dune habitat. Monthly track count surveys conducted by Eglin AFB Natural Resources Branch personnel indicate a 40 percent increase in population from 1996 to 2001 (U.S. Air Force, 2002). Currently, quarterly surveys are used to monitor population status. Current threats to this population include predation by feral cats and loss of dune habitat from recreational foot traffic and storms. Proposed MEU activities would occur within the range of this population.

Least Tern (*Sterna antillarum*)

The least tern is the smallest of the North American tern species. It is currently state-listed as threatened, with only interior U.S. populations federally listed as endangered. On Eglin AFB, nesting colonies have been documented on open, flat areas on SRI and several gravel rooftops on Eglin Main. Successful nesting on SRI is rare, primarily due to heavy predation from feral cats. While most colonies have been documented on the easternmost portion of Eglin's SRI property, another colony was recently documented near test site A-17 (Miller, 2003). This nesting site is situated approximately 1.5 miles west of proposed MEU action areas on SRI.

Southeastern Snowy Plovers (*Charadrius alexandrinus*)

The southeastern snowy plover is state-listed as a threatened species and is one of several shorebird species found on Eglin barrier island property. During the breeding season, these birds may be found foraging anywhere along the SRI beachfront. Nests are typically laid in the wrack line near vegetated areas, and will be abandoned if disturbed. Vehicular and foot traffic, storms, and predation by feral cats are considered the primary causes of nest failure. Eglin beach property contains the highest densities of snowy plovers (37 percent of Florida's breeding pairs) the most productive nesting areas in the state (U.S. Air Force, 2002). For a more thorough description of this species, see Appendix E. Proposed MEU beach landings and maneuvers will occur within snowy plover nesting habitat.

Black Skimmer (*Rynchops niger*)

The black skimmer is one of several ground-nesting shorebirds known to nest on Santa Rosa Island and is listed by the state of Florida as a species of special concern. The greatest threats to

this species are attributed to human disturbance and storm-related flooding of nest sites, as well as predation of eggs and hatchlings (FNAI, 2001). During the nesting season from mid-May through August, skimmers can be seen foraging for fish in nearshore waters of both the Gulf and Santa Rosa Sound. Historically, nesting colonies have been documented in open, flat areas on eastern portions of Eglin island property from test site A-4 to the Destin Pass. However, another colony was documented in June 2002 near test site A-17 (Miller, 2003). This nesting site is situated approximately 1.5 miles west of proposed MEU action areas on SRI.

Eastern Indigo Snake (*Drymarchon corais couperi*)

The eastern indigo snake was federally listed as threatened in 1978 (*Federal Register* Vol. 43, No. 52:11082 – 11093), and is also a state threatened species. The eastern indigo snake is the largest nonvenomous snake in North America and can grow up to 125 inches in length. The Florida Panhandle has a few known small populations of the eastern indigo snake, but it is generally considered rare in the region. On Eglin AFB, these snakes can be found in a wide variety of habitats. However, during winter denning season (December through April) they are most likely to be found in upland sandhill habitats, usually in association with gopher tortoise burrows. During other seasons, indigos can be found in almost any other habitat type but are most likely to be found foraging or seeking shade on the edges of wetlands or in creek bottoms. Sightings on Elgin AFB have been sparse, with only 18 incidental sightings between 1974 and 1999 (U.S. Air Force, 2002). Most sightings on Eglin have been roadkills, suggesting that these large, slow moving animals may be vulnerable to direct physical impact from MEU vehicular movement.

Florida Burrowing Owl (*Athene cunicularia floridana*)

The Florida burrowing owl is not federally listed but is protected under the Federal Migratory Bird Treaty and is listed by the state of Florida as a species of special concern. On Eglin, a breeding population of burrowing owls can be found on TA B-70, where owls benefit from prairie-like grassland habitat created by maintenance of the grass grid and frequent, mission-related fires. Volunteers from the Choctawhatchee Audubon Society monitor this population monthly. Surveys indicate that the population is stable, suffering little from frequent mission activity on the range (Fenimore, 2003). Proposed MEU activities may occur near Eglin’s burrowing owl population.

Florida Black Bear (*Ursus americanus floridanus*)

The Florida black bear, state listed as threatened, has been sighted throughout Eglin. The bear population on Eglin is Florida’s fifth largest population of the subspecies. Black bears inhabit swampy areas, flatwoods, stream riparian areas, and the pine-oak forests of the Sandhills. They prefer wooded and shrubby areas, but will use meadows, clear-cuts, burned areas, and riparian areas, and use forested areas as travel corridors. During winter the bears may hibernate in tree cavities, under logs and rocks, in banks, caves, or culverts and in shallow depressions (Hamilton and Marchinton, 1980). Black bears eat a variety of foods relying most heavily on grasses, herbs, fruits, and mast. They also feed on carrion and insects (Jonkel, 1978).

Bog Frog (*Rana okaloosae*)

The Florida bog frog (*Rana okaloosae*) was first discovered in 1982 and is listed by the state of Florida as a species of special concern. The entire global distribution of this species lies within Walton, Okaloosa, and Santa Rosa counties, with the only known sites found on Eglin AFB and three locations to the north of the base. The species' restricted distribution may be due to characteristics of the area's streams and soil. All known locations are small tributary streams to the Yellow, Shoal, or East Bay Rivers. Proposed MEU activities may occur on the Yellow River.

Bald Eagle (*Haliaeetus leucocephalus*)

The bald eagle is federally and state listed as threatened. On the Eglin Main Reservation, the only known bald eagle nest can be found approximately 1,000 feet west of TA A-22 and about 170 feet from the shoreline of Choctawhatchee Bay.

Gopher Tortoise (*Gopherus polyphemus*)

The gopher tortoise is currently listed by the state of Florida as a species of special concern. Gopher tortoise burrows are essential to the ecosystem of dry, sandy uplands because they provide shelter for the gopher tortoise as well as many other species, including such sensitive species as the indigo snake, pine snake, and gopher frog. The number of active burrows on Eglin appears to be low when compared to the amount of suitable habitat. Gopher tortoise burrows have been noted at TA B-12, C-52C, C-52E, B-70, and C-62 and at Eglin Main (USAF, 1995). Proposed MEU activities will take place within gopher tortoise habitat and may impact active and inactive burrows.

Florida Pine Snake (Pituophis melanoleucus)

The Florida pine snake, a state species of special concern, is a large (to 8.3 feet), white, tan, and black serpent. The snake is typically found in Sandhill sandy soil areas occurring primarily in longleaf pine/turkey oak forests. Male and female snake home ranges have been reported to vary from 3 to 68 acres. The snakes primarily feed on small mammals, birds and their eggs, lizards, other snakes and their eggs, and insects. Nests are excavated in exposed, unvegetated soft-packed soil with little or no organic matter to a depth of 9 to 12 inches. Nest clearings average 166 feet long and 260 feet wide on slopes of less than 14 degrees. As with the eastern indigo snake, the pine snakes are known to use active and inactive gopher tortoise burrows. Habitat loss and degradation are primary reasons for population declines of this species (Jordan, 1998).

Snowy Egret (*Egretta thula*)

The snowy egret is a small, white, yellow-toed wading bird designated as a species of special concern by the Florida Fish and Wildlife Conservation Commission (FWC, 2003). The breeding distribution of this species ranges from northern California east to South Dakota and south to Florida and parts of the Caribbean and South America. In Florida, breeding season lasts from January through August. Snowy egrets spend the winter months in the southernmost parts of their breeding range, the U.S. southeast, and in southern California. In the Florida panhandle,

colonies of snowy egrets nest primarily in swamps or in emergent vegetation in conjunction with other species of wading birds. This species forages in both freshwater and saltwater habitats for fish, shrimp, and small vertebrates (FWC, 2003).

Little Blue Heron (*Egretta caerulea)*

The little blue heron, closely related to the snowy egret, is listed as a species of special concern by the state of Florida because of its dependence on wetlands, which are diminishing (FWC, 2003). While it is not rare in coastal areas, it seems to prefer freshwater habitats. The little blue heron is a solitary feeder but a colonial nester that often occurs with other species of wading birds. Its diet consists of insects, shrimp, amphibians, and fish. In Florida, breeding occurs from April through September, and migrations may occur in the panhandle from February through March (FWC, 2003).

Tricolored Heron (*Egretta tricolor*)

The tricolored heron is a slim, medium-sized heron with a head and upper body dark slate blue in color with purple coloration on its chest. This species, formerly known as the Louisiana Heron, is designated a state species of special concern. Breeding occurs from February through August. This species nests in colonies, often with other heron and ibis species, from Massachusetts down to the Caribbean and northern Brazil. It is a solitary feeder, foraging in both fresh and saltwater habitats (FWC, 2003).

White Ibis (Eudocimus albus)

The white ibis has been designated a species of special concern by the Florida Fish and Wildlife Conservation Commission due to species declines (FWC, 2003). Coastal islands, freshwater marshes or ponds, and standing water provide breeding habitat for this species. This species usually nests from March to August but has been known to nest from February through October in the Florida panhandle. The white ibis migrates generally in February and in September-October. It is rare or absent from the panhandle during the winter months. Prey organisms include crayfish, crabs, insects, snakes, frogs, toads, and fish (FWC, 2003).

Southeastern American Kestrel (*Falco sparverius paulus*),

The southeastern American kestrel (*Falco sparverius paulus*), state listed as threatened, is a common permanent resident of Eglin. This small raptor typically preys on small rodents, reptiles, and insects in clearings or woodland edges. The kestrels occupy nearly all Grassland/Shrubland, Sandhills, and other forested community types. Habitat requirements include an adequate prey base, perch sites, and nesting sites. They mostly inhabit open forests and clearing edges with snags. The thick understory and midstory in Sandhills communities that are cut or are not burned may have an adverse effect on kestrel populations. Prescribed burning can be beneficial since it enhances habitat and increases the prey base (Hoffman and Collopy, 1988).

Nests are normally located along the forest edge and may be used for several years. The kestrels prefer to nest in tight-fitting live tree cavities and snags created by other birds (DeGraff et al., 1991). The birds most frequently locate their nests in abandoned red-cockaded woodpecker and

other woodpecker holes in longleaf pines 12 to 35 feet above the ground. Natural cavities and snags in turkey oaks and live oaks may also be used as nesting sites (Hoffman and Collopy, 1987).

The kestrels are quite tolerant of human activity around their nests. They are frequently flushed or caught at the nest without desertion. In Ohio, kestrels use centers of human activity more than other raptors (Fischer et al., 1984).

Dusky Gopher Frog (*Rana capito sevosa*)

Dusky gopher frogs (*Rana capito sevosa*), state listed as a species of special concern, are associated with gopher tortoise habitat, as they use gopher tortoise burrows for cover, but are also known to flourish where the tortoises no longer occur. They will also use old field mouse burrows, hollow stumps, and other holes for cover. The species requires nearby seasonally flooded grassy ponds, depression marshes, and some Sandhills upland lakes that lack fish populations, found within the Sandhills ecological association, for breeding. They have been found in the longleaf pine, turkey oak, pine flatwood, sand pine scrub, and xeric hammock open or forested communities of the Sandhills and Open Grassland/Shrubland ecological associations up to two kilometers from the breeding ponds. Eglin supports the largest known concentration of reproductive sites of the dusky gopher frog subspecies anywhere within its range (FNAI, 2001).

Pine Barrens Tree Frog (*Hyla andersonii*)

The pine barrens tree frog (*Hyla andersonii*), state listed as a species of special concern, is a small (~1.5 inches) lime-green frog with a maroon/brown stripe on its sides and a white belly. It is typically found in herbaceous and shrubby bogs of the Wetland/Riparian ecological association near clear, shallow water along the Blackwater and Yellow rivers and Choctawhatchee Bay. Breeding, initiated by a repeating call resembling a nasal "quonk," occurs between March and September, with tadpoles emerging between May and August. Stream and water quality degradation and hardwood forest encroachment are the main threats to this species (FNAI, 2001).

Sherman's Fox Squirrel (*Sciurus niger shermani*)

Sherman's fox squirrel (*Sciurus niger shermani*), state listed as a species of special concern, is a large tree squirrel with a variable fur color ranging from black to silver, long tail, and typically black head and white ears and muzzle. The squirrel typically nests in oak trees found in the Sandhills and Flatwoods ecological associations, feeding on longleaf pinecones and seeds. Habitat destruction from natural to plantation conversion and development are the main threats to this species. Encroachment of shrubby vegetation due to lack of fire is also a factor in habitat degradation (FNAI, 2001).

3.12 SENSITIVE HABITATS

Sensitive habitats found within the Eglin Military Complex include wetlands (discussed in more detail in Section 3.5), Florida Natural Areas Inventory (FNAI) Tier I pristine vegetative communities and FNAI Significant Botanical sites (U.S. Air Force, 1996b), Essential Fish Habitat as identified in the Magnuson-Stevens Fisheries Act, and critical habitat for sensitive species as identified by the USFWS.

Wetlands

Activities that may affect wetlands (protected by the Clean Water Act) go through a permit process with the state as well as with the U.S. Army Corps of Engineers (ACE). Activities minimizing impacts to wetlands are preferred, and the planning process should reduce or minimize ground-disturbing projects or actions occurring in a wetland (U.S. Air Force, 1995). Wetlands are most prominent in the Swamp ecological association, although some wetlands are also found in the Flatwoods ecological association. The Swamp ecological association, which is predominantly wetlands, covers approximately 37,000 acres of Eglin AFB.

FNAI Tier I Vegetative Communities

The FNAI is part of the Conservation Science Division of the Nature Conservancy, and works cooperatively with the Florida Department of Environmental Protection (FDEP). The mission of FNAI is to collect, interpret, and disseminate ecological information critical to the conservation of Florida's biological diversity. FNAI maintains a state-wide database on the distribution, status, and management of exemplary natural communities; endangered and rare plants and animal taxa; and managed areas in Florida. FNAI classifies land areas into the following four-tiered classification system (FNAI, 1995):

- Tier I: Vegetative communities that are in or closely approximate their natural state and undisturbed condition. The goal of management is to maintain the natural community.
- Tier II: Vegetative communities that retain a good representation and distribution of associated species typical of the undisturbed state, but have been exposed to moderate amounts and intensities of disruptive events. Through careful management, the community may be restored or maintained.
- Tier III: Vegetative communities that do not retain good representation and distribution of associated species and have been exposed to severe amounts and intensities of disruptive events. Significant and intensive management over extended periods would be required to restore these communities (pine plantations, etc.).
- Tier IV: Areas on Eglin that have a designated land use, such as test areas, developed areas, sewage disposal areas, roads, power line rights-of-way, and other uses. The nature of the designated use determines the management goal.

This classification system has been applied to reservation land at Eglin AFB. Consequently, several Tier I communities have been identified (Figures A-48 through A-55, Appendix A). Tier I *hydric/hydric/mesic* communities are the most sensitive to degradation. There are

approximately 2,000 acres on the Eglin reservation that have been designated as Tier I hydric/mesic communities.

FNAI Significant Botanical Sites

Chafin and Schotz (1995) identified 16 areas on the Eglin reservation as significant botanical sites due to value as habitat for rare plant species or because of the high quality or rarity of their natural vegetative communities on Eglin. Special protection at these sites is warranted for two reasons: 1) high density of federal and state protected plant species, and 2) uniqueness of habitat that supports sensitive animals as well as plants. No state listed threatened and endangered plant species at these sites can be taken or disturbed unless a permit is authorized by the Florida Fish and Wildlife Conservation Commission (FWC). In addition, habitat that supports federally listed species must be conserved in accordance with the Endangered Species Act. These sensitive sites constitute about 20,000 acres on Eglin AFB.

Essential Fish Habitat

The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act require, among other things, that the National Marine Fisheries Service (NMFS) and regional Fishery Management Councils designate essential fish habitat (EFH) for species included in a fishery management plan. EFH is defined as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. Federal agencies that fund, permit, or carry out activities that may adversely affect EFH are required to consult with NMFS regarding potential impacts, and respond in writing to NMFS and Fishery Management Council recommendations. Adverse impacts are defined as impacts that reduce quality and/or quantity of EHF, and may include contamination, physical disruption, loss of prey, and reduction in species' fecundity. The management of sensitive habitats on Eglin is the responsibility of the Natural Resources Management Branch (AAC/EMSN).

EFH has been identified by the NMFS for several species within the area encompassed by the proposed action. These species and their habitat by life stage are presented in Appendix C.

EFH present in the area includes emergent vegetation, submerged aquatic vegetation (seagrasses), oyster reefs, *Sargassum*, and artificial reefs/underwater obstructions. With the exception of *Sargassum*, which does not occupy a fixed location, the distribution of these habitats is shown in Figures A-43 to A-47, and A-65 to A- 66, Appendix A.

Emergent Vegetation

Emergent vegetation species occur in isolated locations in Choctawhatchee Bay and Santa Rosa Sound and East Bay as areas of saltmarsh and beach vegetation. North Florida marshes typically support *Juncus roemerianus* (black needle rush), *Spartina* sp. (smooth cordgrass), *Distichlis spicata*, *Scirpus* spp., *Salicornia* spp., and *Phragmites australis* among others (Wolfe et al., 1988). Field verification of areas of highly concentrated marsh vegetation revealed the dominant species in Choctawhatchee Bay to be the salt-tolerant perennial *Juncus roemerianus* (Livingston, 1986); *Spartina alterniflora* was also documented. The primary occurrence of these species at the proposed action locations appears to be primarily a wetland or beach component and not as fish habitat, since inundation by marine or estuarine waters occurs only during storm events. As

such, the areas at the Choctawhatchee Bay locations (i.e. White Point and TA D-84) and on the Sound side of Santa Rosa Island at A-13B are technically considered wetland and are not providing fish habitat. As a result, this area is addressed in this document as a part of the wetland environment.

Seagrasses

The Florida Marine Research Institute estimates total seagrass coverage in Choctawhatchee Bay and the Okaloosa County portion of Santa Rosa Sound at 4,160 acres (Sargent et al., 1995). The seagrass bed nearest to any of the activities occurs approximately 3,000 feet to the east of Wynnhaven Beach. Seagrass generally does not occur in East Bay. The habitat on the Gulf side of Santa Rosa Island is a sandy/silty substrate, which does not support large areas of seagrass beds. The nearest major seagrass bed in the Gulf of Mexico is located to the southeast of Cape San Blas, outside of the study area. More information on seagrasses and other submerged vegetation species is provided in Appendix C.

Oyster Reefs

Oyster reefs are ecosystems formed from aggregations of live oysters, oyster shells, and other organisms growing on accumulations of generations of oyster shell substrate (Wolfe et al., 1988). The reef structure provides habitat for algae, hydroids, bryozoans, barnacles, mussels, worms, sponges, and crabs (Wolfe et al., 1988), as well as some species of fish.

In the Proposed Action area, oyster reefs occur in Choctawhatchee Bay and East Bay. The primary species is the American oyster, *Crassostrea virginica*. In Choctawhatchee Bay, oyster beds are located east of the Mid-Bay Bridge with several locations near TA D-84.

Sargassum Community

Sargassum, or Gulfweed, a dominant genus in surface marine waters, is a free-floating brown algae that is present in the tropics and subtropics including the Gulf. *Sargassum* drifts as mats in oceanic eddies, provides an important niche for numerous species, and supports a unique community of animals. Fish may use *Sargassum* clumps for food or as habitat to lay their eggs (Adams, 1960; Bortone et al., 1977; Dooley, 1972; Smith, 1973). Between 1971 and 1976, 15 families and 40 species of fish were collected at 62 *Sargassum* locations within the eastern Gulf (Bortone et al., 1977). Sea turtle hatchlings also use *Sargassum* as a vehicle for passive migration and shelter (Collard and Ogren, 1990) and the abundance of invertebrate fauna that inhabit the mats is an important food source for sea turtles (Carr and Meylan, 1980; Carr, 1987).

Artificial Reefs

Artificial reefs consist of materials deposited on the ocean floor, usually for the purpose of enhancing fishing or other recreational activities. Artificial reefs provide bottom relief and habitat for fish and other marine species in areas that may otherwise be featureless. A few artificial reefs exist in Choctawhatchee Bay, but are not in close proximity to any of the planned action areas. One artificial reef exists close to the landing points on the Gulf side of Santa Rosa Island.

Critical Habitat

Under the ESA, the USFWS is to designate critical habitat for each listed species. Critical habitat is defined by the ESA as specific areas within or outside the geographical area occupied by the species that contain physical or biological features essential to the species' conservation and that may require special management considerations or protection.

Critical Habitat for Gulf Sturgeon

The proposed rule for Gulf sturgeon critical habitat was published in the Federal Register in June 2002, but a final determination has not been made. In the area of interest, all of Choctawhatchee Bay, East Bay, Santa Rosa Sound, and the Yellow River are proposed as critical habitat.

The Gulf sturgeon inhabits offshore areas and inland bays during the winter months and moves into freshwater rivers during the spring to spawn (USFWS and GSMFC, 1995). Migration into freshwater generally occurs from March to May, while migration into saltwater occurs from October through November. Within the region of influence, sturgeon occur in the Yellow River in the spring and summer, and in Choctawhatchee Bay, Santa Rosa Sound, and the Gulf of Mexico in the winter. More information on sturgeon habitat is available in Appendix E.

Distribution and area/habitat preference in Choctawhatchee Bay may be related to sturgeon age. Sub-adult sturgeon are located frequently in LaGrange and Alaqua Bayous, while adults seem to prefer Hogtown Bayou. Areas east of the Highway 331 bridge are generally not used as winter habitat (USFWS, 2001a, pers. comm.). Sturgeon have been found on both sides of the Mid-Bay Bridge, but decrease in occurrence west to Fort Walton Beach.

The southernmost portion of the Yellow River may contain potential summer refuge areas for sturgeon (Craft et al., 2001). Adult sturgeon have been found to congregate in relatively high numbers in these summer refuge areas, though their distribution is spread over the entire length of the Yellow River. Generally, the summer refuge areas are located in the southern part of the Yellow River adjacent to Eglin property. Heavy sediment loads and low water volume from drought conditions were identified as factors potentially affecting sturgeon migration in the Yellow River. Due to the low number of sturgeon observed in East Bay during the winter, Craft et al. (2001) theorize that the majority of sturgeon in that region migrate to the Gulf of Mexico during the winter months.

Critical Habitat for Piping Plover

The preservation of critical habitat in wintering areas is important to the survival of piping plover populations. Quality winter foraging and roosting is necessary if adults are to survive, migrate back to breeding sites, and nest successfully (USFWS, 2001). Critical habitat designation for wintering and breeding grounds for the piping plover was published in the Federal Register on July 10, 2001. The Navarre Beach piping plover critical habitat (USFWS Unit FL-3) consists of 118 acres in Escambia and Santa Rosa counties. Eglin Air Force Base and Santa Rosa Island Authority own the majority of the unit. Within property administered by Eglin, critical habitat is situated on the north shore of Santa Rosa Island/Okaloosa Island (SRI/OI) west of Test Site A-15. Activities associated with MEU training would not occur in or near piping plover critical habitat.

Marine Protected Areas

A marine protected area (MPA) is defined as any area of the marine environment that has been reserved by federal, state, territorial, tribal, or local laws or regulations to provide protection for the natural or cultural resources therein. MPAs may include national marine sanctuaries, fishery management zones, national parks, state preserves, and many other types of areas. Federal agencies whose actions affect the resources protected by an MPA must identify the actions and, to the maximum extent practicable, avoid harming the resources. Several such areas exist in the eastern Gulf of Mexico, but only two offshore areas are located within or close to the area of study. These areas are the Reef Fish Stressed Area and the Desoto Canyon Closed Area. The Reef Fish Stressed Area is a Federal Fisheries Management Zone and includes inshore coastal waters throughout the Gulf. The purpose of the area is to rebuild declining reef fish stocks. Commercial bottom trawling, roller trawls, and commercial traps are not allowed in the area. The Desoto Canyon Closed Area exists offshore of the western Florida panhandle and Alabama coast. The purpose of this area is to reduce the number of undersized swordfish, billfish, and other species incidentally caught with pelagic longline gear. As such, commercial fishing is not allowed in the area.

3.13 CULTURAL RESOURCES

Cultural resources consist of prehistoric and historic districts, sites, structures, artifacts, and any other physical evidence of human activity considered important to a culture or community for scientific, traditional, religious, or other reasons. Historic properties are cultural resources included in, or eligible for inclusion in, the National Register of Historic Places (National Register) maintained by the National Park Service. The National Register includes artifacts, records, and remains that are related to and located within such properties. As federal agency, the U.S. Marine Corps and Eglin Air Force Base are required under the National Historic Preservation Act of 1966, as amended (NHPA), to consider the effects of its undertakings on historic properties listed, or eligible for listing, in the National Register.

Under Section 106 of the NHPA, when a federal action meets the definition of an undertaking, the federal agency must consult with the State Historic Preservation Officer (SHPO) and any other identified consulting parties. The federal agency is responsible for determining whether any historic properties are located in the area and assessing whether the proposed undertaking will adversely affect the resources. The federal agency is also responsible for notifying the SHPO, and the Advisory Council on Historic Preservation, of any adverse effects. An *adverse effect* is defined as any action that may directly or indirectly alter the characteristics that make the property historic (and thus eligible for listing on the National Register). The federal agency then consults with the SHPO to develop measures to avoid, minimize, or mitigate the adverse effects of the federal undertaking.

In addition to the SHPO, the NHPA mandates that federal agencies consult with federally recognized Indian tribes to identify, evaluate, and treat historic properties that have religious or cultural importance to those groups. Eglin AFB is currently conducting a study to identify existing federally recognized tribes that have historic ties to the local area. These tribes will then be consulted to identify Eglin properties of importance to them. To date no traditional cultural properties have been identified on Eglin AFB.

More than 1,800 archaeological sites have been identified on Eglin AFB. Approximately 300 sites are eligible or potentially eligible for listing on the National Register. These must be considered during the planning and execution of any federal undertaking that has the potential to affect them.

Description of Existing Conditions

This section contains information on known cultural resource sites that are listed, eligible, or potentially eligible for listing on the National Register that could be adversely impacted by the proposed action. Appendix A illustrates locations of cultural resource areas. Since many portions of the Eglin Reservation have not been inventoried for the presence of cultural resources, it is not known precisely how many historic properties may ultimately be affected by ARG/MEU training. To avoid or mitigate adverse effects at all potential historic properties, a memorandum of agreement (MOA) will be negotiated with the Florida SHPO. The MOA will detail procedures that must be carried out to locate, evaluate, and protect any historic properties that may be affected by the proposed action. The MOA will serve as a vehicle to ensure compliance with Section 106 of the NHPA throughout the period covered by this EA.

Yellow River

Table 3-14 provides a summary of the known archaeological sites associated with ARG/MEU insertion points along the Yellow River. Figures A-62 and A-63 illustrate the locations of these sites.

Table 3-14. Cultural Resources Sites – Yellow River

Site #	Eligibility for NRHP	Comments
8SR116	Potentially Eligible	Historic boat launch
8SR124	Eligible	Multicomponent prehistoric, historic cemetery, homestead, turpentine processing
8SR188	Potentially Eligible	Multicomponent prehistoric, historic
8OK205	Potentially Eligible	Turpentine processing plant
8OK1671	Potentially Eligible	Historic homestead

Santa Rosa Island

A summary of known cultural resources sites on Santa Rosa Island is listed in Table 3-15 and illustrated in Figure A-58.

Table 3-15. Cultural Resources Sites – Santa Rosa Island

Site #	Eligibility for NRHP	Comments
8OK176	Eligible	Late woodland site
8OK182	Eligible	Mississippian
8OK152	Eligible	Mississippian/contact
8OK153	Eligible	Shell mound with evidence of occupations from early Woodland to contact period
8OK244	Potentially Eligible	Prehistoric shell midden
8OK175	Potentially Eligible	Mississippian Village
8OK240	Potentially Eligible	Prehistoric shell midden
8OK241	Potentially Eligible	Prehistoric shell midden
A-15A Historic District	Eligible	Bomarc Test Site

Wynnhaven Beach

Archaeological site 8OK239 is located within the Wynnhaven Beach Corridor (Figure A-60). This site contains the remains of both a prehistoric settlement and a 20th century artifact scatter. The 20th century remains are not eligible for listing on the National Register. The prehistoric component, however, contains intact midden deposits and cultural features that may yield data that would advance an understanding of the settlement patterns of prehistoric Indian cultures in this region. The Air Force, in consultation with the SHPO, has identified the site as eligible for listing on the NRHP based on its prehistoric value.

Hammock Point (TA D-84)

Table 3-16 presents a summary of the significant sites located on Hammock Point. These are illustrated in Appendix A, Figure A-57.

Table 3-16. Cultural Resources Sites – Hammock Point

Site #	Eligibility for NRHP	Comments
8WL58	Eligible	Large middle woodland village; evidence of structures. Site is protected by fence and riprap.
8WL68	Eligible	Contact period village, eastern portion in Ft. Rucker is clear, but monitor improvements western portion - protection.
8WL998	Potentially Eligible	Prehistoric site.

White Point

Archaeological site 8OK784, illustrated in Figure A-59 of Appendix A, is a large multi-component prehistoric site and is eligible for listing on the National Register. The site contains a high artifact density with diagnostic materials and intact shell midden deposits. Other cultural features may be present on the site. The site's location in relation to White Point is illustrated in Appendix A, Figure A-59.

East Bay Point

East Bay Point contains seven important archaeological sites. See Figure A-56, Appendix A, for cultural resource concerns. Each of these sites requires further delineation to determine the full

horizontal extent of the site boundaries. Table 3-17 presents a summary of the sites located at East Bay Point.

Table 3-17. Cultural Resources Sites – East Bay Point

Site #	Eligibility for NRHP	Comments
8SR17	Eligible	Large prehistoric site.
8SR234	Eligible	Homestead of antebellum period with prehistoric component.
8SR239	Eligible	William Millerie sawmill dating to the 1880s with prehistoric component.
8SR1251	Eligible	Only known British site on Eglin. Dates to 1763.
8SR44	Eligible	Only known preceramic mound site on Eglin.
8SR1415	Eligible	Prehistoric; probable mound site.
8SR1416	Potentially Eligible	Large prehistoric site.

Hurlburt Field

Three significant archaeological sites are located adjacent to the gravel offload area on Hurlburt Field (see Figure 1-2 for the location of Hurlburt Field). All three sites are prehistoric, contain shell midden, and are eligible for listing on the National Register. Table 3-18 summarizes information regarding the sites at Hurlburt Field.

Table 3-18. Cultural Resources Sites – Hurlburt Field

Site #	Eligibility for NRHP	Comments
8OK126	Eligible	Prehistoric shell midden with evidence of occupation from Early Woodland to Contact period.
8OK133	Eligible	Prehistoric shell midden with historic component.
8OK380	Eligible	Late Archaic, Early Woodland prehistoric site.
8OK5	Eligible	Prehistoric shell midden and ceramic scatter; human remains found exposed at the shoreline in 1992.
8OK61	Eligible	Shell middens with evidence of occupation from Early to Late Woodland periods.

Alaqua Point

Four significant archaeological sites are located at or near the Alaqua Point landing site (see Figure A-61). The sites are summarized in Table 3-19.

Table 3-19. Cultural Resources Sites – Alaqua Point

Site #	Eligibility for NRHP	Comments
8WL119	Eligible	Large multicomponent site with intact midden. Only site on Eglin that has yielded maize.
8WL162	Eligible	Multicomponent prehistoric site with intact midden and features.
8WL1045	Eligible	Single component Mississippian site with midden.
8WL1050	Eligible	Large multicomponent prehistoric site.

Range A-22

Two significant archaeological sites are located at the A-22 landing site on Eglin Main Base (Figure A-64). The sites are summarized in Table 3-20.

Table 3-20. Cultural Resources Sites – Range 22

Site #	Eligibility for NRHP	Comments
8OK939	Eligible	Late 19th to early 20th century rural homestead
8OK942	Eligible	Single-component Weeden Island site with intact shell midden

Interstitial Areas

Interstitial areas include all areas on the Eglin Reservation outside of the test areas, auxiliary fields, and Eglin Main Base (Figure 1-2). The interstitial areas contain hundreds of archaeological sites that are eligible or potentially eligible for listing on the National Register, spanning a period of time from 8000 B.C. to the Cold War era. The Cultural Resources Division at Eglin AFB is systematically surveying this landmass, employing intensive reconnaissance surveys designed to provide two levels of data. First, a detailed site database has been generated to depict the range and patterning of prehistoric occupation and to reconstruct historic land use patterns on Eglin. Site data are then used, along with detailed environmental observations, to develop a predictive model of site locations for the unsurveyed areas of the installation.

This proactive approach to cultural resources management has resulted in a cultural resources survey of approximately 26 percent of the base. Seventy-four percent of the reservation has not been surveyed. However, by the use of predictive modeling, areas unlikely to contain significant archaeological sites are not required to be surveyed. Areas likely to contain sites, termed “high probability areas,” must be surveyed prior to any undertaking that could create ground disturbance. Approximately 50,000 acres of high probability areas remain on Eglin AFB, much of it in the interstitial areas.

Auxiliary Fields and Landing Zone East

No cultural resources are located at Auxiliary Fields 2, 4, and 10. None are known to be located at Auxiliary Field 8, but portions of this field are scheduled for survey. See Figure 1-2 for field locations. Table 3-21 summarizes the known cultural resources located at the auxiliary fields on the Eglin Reservation. This is not a complete list. Archaeological surveys are likely to locate additional significant resources.

Table 3-21. Cultural Resources Sites – Auxiliary Fields

Location	Site #	Eligibility for NRHP	Comments
Aux. 1 / C-5	8WL1025	Potentially Eligible	Large turpentine side camp and possible mill site.
Aux. 2 / C-3	None		Clear of cultural concerns.
Aux. 3 / Duke Field	8OK251	Potentially Eligible	Multicomponent prehistoric site with very early cultural affiliation.
Aux. 4 / B-2	None		Clear of cultural concerns.
Aux. 5 / B-4	8OK1691	Potentially Eligible	Single component prehistoric site with diverse artifacts.
	8OK1699	Potentially Eligible	Historic structure complex.
Aux. 6 / Ranger Camp	8OK164	Potentially Eligible	Turpentine processing activity with housing area – Metts community.
Aux. 7 / B-12	8SR19	Eligible	Late woodland village and possible historic saw mill.
Aux. 7 / B-12	8SR1426	Potentially Eligible	One of very few sites on Eglin that contains an early Archaic component.
Aux. 8	None known		Portions of this field falls in HPA needs survey.
Aux. 10	None		Clear of cultural concerns.
LZ-East	None		Clear of cultural concerns.

Test Areas

Table 3-22 provides a summary of the cultural resources that are associated with the test areas on the Eglin Reservation. Ranges A-77 and B-70 and B-75 have been surveyed and are known to be free of cultural resources. All other ranges have high probability areas that require survey, have been surveyed but contain historic properties requiring protection, or a combination of both. This is not a complete list. Archaeological surveys are likely to locate additional significant resources.

Table 3-22. Cultural Resources Sites – Test Areas

Location Test Area:	Site #	Eligibility for NRHP	Comments
A-77	None		Clear of cultural concerns.
A-78	None known		Contains HPA area, needs survey.
A-79	8SR1333	Potentially Eligible	Historic homestead.
A-79	8SR1515	Potentially Eligible	Harvell or Coleman homestead with evidence of three possible structures.
A-79	8SR1531	Potentially Eligible	Harvell or Barlow homestead with brick concentrations – part of the community.
A-79	8SR1541	Potentially Eligible	Harvell or Wells homestead, artifact concentrations containing structural remains.
B-5	8OK140	Eligible	Late woodland village.
B-12	8SR19	Eligible	Late woodland village and possible historic saw mill.
B-70	None		Clear of cultural concerns.
B-71	None known		Range is clear; however HPA areas on perimeter have not been surveyed.
C-72	Subpens	Potentially Eligible	Replicas of German subpens built in 1944 in support of WWII. Scheduled for evaluation.
C-72	Tunnels	Potentially Eligible	Replica of tunnels in Vietnam.
B-75	None		Clear of cultural concerns.
C-52		HPA	Needs survey.
C-52N, C52-C		HPA	Needs survey.
C-52-W	8WL116	Potentially Eligible	
C-52-W		HPA	Needs survey.
C-52A	8WL1532	Potentially Eligible	
C-52A	8WL328	Potentially Eligible	
C-52A		HPA	Needs survey.
C-52B	8OK1663	Eligible	Crossbow, replica of German launch facilities, built to aid the Allied Forces in WWII.
C-53			Surveyed, sites are present. Awaiting details.
C-62	8WL0111	Potentially Eligible	
C-62			Surveyed, sites are present. Awaiting details.

4. ENVIRONMENTAL CONSEQUENCES

4.1 TRANSPORTATION

All emergency vehicles would be accommodated and allowed to pass through highway crossing areas. Highway closures require coordination with the Okaloosa County Sheriff's Department and advance notification of the Florida Department of Transportation (FDOT) Public Information Office and local emergency services providers in Okaloosa and Santa Rosa Counties (FDOT, 2003).

4.1.1 Proposed Action

4.1.1.1 Impacts from Amphibious Landings

As amphibious landings, independent of other MEU training activities, would not impact (cross) any public roads, there will be no significant impact on transportation.

4.1.1.2 Impacts from Ground Movement

Wheeled Vehicles

Under the Proposed Action, wheeled vehicles would be brought ashore via landing craft, including LCACs and LCUs at Santa Rosa Island and Hurlburt Field and LCACs at Wynnhaven Beach, White Point Alaqua Point, and Hammock Point (TA D-84). Wheeled vehicles would then be offloaded and driven to objective locations interior of the reservation. Once on the Eglin Range, wheeled vehicles would follow existing range roads wherever possible to objective locations. Dirt/clay range roads would also be traveled by tracked vehicles on the Eglin Range. No wheeled vehicles would land at East Bay or Yellow River.

<u>Wynnhaven Beach and Hurlburt Field</u>: Wheeled vehicles (including LAVs, 7-ton trucks, HMMWVs) offloaded at Wynnhaven Beach and Hurlburt would cross US 98 and proceed north to objective areas interior of the reservation. Additionally, there is the possibility that low-boy trailer trucks may be used to haul tracked vehicles at the Hurlburt Field landing dock. Wheeled vehicles alone (with no tracked vehicles) would cross US 98 with the assistance of military guards and local law enforcement. Crossing US 98 with wheeled vehicles would inevitably cause traffic slowdowns; however, complete highway closures may not be necessary. Coordination with the FDOT would not be required to secure a State Road Closure Permit for appropriate traffic route closures for wheeled vehicles; however, FDOT would require the presence of a duty/off-duty law enforcement officer in areas of congestion, critical traffic flow, or situations that may cause hazardous conditions. Significant impacts to transportation resulting from the temporary closures of US 98 for wheeled vehicles will not occur.

<u>White Point, Alaqua Point and Hammock Point (TA D-84)</u>: At White Point, Alaqua Point and Hammock Point, up to five LCAC landings and an unspecified number of Zodiacs would land at each location per 10-day training period. The LCACs would carry wheeled vehicles (including LAVs, 7-ton trucks and HMMWVs).

There is the possibility that tracked vehicles, including the M1A1 tanks, would land at Hammock Point. If so, the tanks would be loaded on low-boys and transported onto the Eglin Military Complex. Wheeled vehicles offloaded at Hammock Point would move directly across State Route 20 and enter the Eglin Military Complex via RR 214. Wheeled vehicles offloaded at Alaqua Point would turn west onto HWY 20, travel approximately 5 miles and enter the Eglin Military Complex through RR 214. Closures of HWY 20 would be brief to allow a convoy of 10 to 20 wheeled vehicles onto the road. These closures would not be expected to last more than 5 to 10 minutes.

It is important to note that these vehicles would be carrying live munitions while accessing the public roads. These vehicles would display appropriate placarding for carrying live munitions.

At White Point, wheeled vehicles would proceed in a convoy northeast along White Point Road (Route 294). The convoy would then turn west on SR 20, north onto Range Road and enter onto the reservation on Range Road 218. White Point Road bisects the commercial and residential areas of Bluewater Bay (near Niceville). The wheeled vehicles in this convoy would be carrying live munitions. (Section 4.4 provides more information.) Wheeled vehicles crossing State Route 20 and traversing on White Point Road and Range Road would also require the assistance of military guards and local law enforcement for traffic control. Crossing SR 20 with wheeled vehicles would inevitably cause traffic slowdowns; however, complete highway closures may not be necessary. If necessary, closures of White Point Road would be brief, on the order of 5 to 10 minutes, to allow a convoy of 10 to 15 vehicles onto the road. As such, coordination with the FDOT would be not be required to secure a State Road Closure Permit for appropriate traffic route closures for wheeled vehicles; however, FDOT would require the presence of an duty/off-duty law enforcement officer in areas of congestion, critical traffic flow, or situations that may cause hazardous conditions.

For all highway closures, the peak traffic hours of 6 to 8 a.m. and 4 to 6 p.m. will be avoided. Major tourist holidays would be avoided as well.

Significant impacts to transportation resulting from the closures of SR 20 for wheeled vehicles will not occur.

Tracked Vehicles

Under the Proposed Action, tracked vehicles would land (i.e., AAVs) or be brought ashore (i.e., M1A1 tanks) via LCAC and LCU landing craft. At Santa Rosa Island and Wynnhaven Beach, AAVs would land (no public roads) and tanks would be offloaded from landing craft. At the Hurlburt Gravel Offloading Site (GOS), LCUs would unload tracked and wheeled vehicles. LCACs would deliver tracked vehicles to Hammock Point (TA D-84); the vehicles would then be trucked onto the Eglin Military Complex. Once on the Eglin Range, tracked vehicles would follow existing tank trails wherever possible. Dirt/clay range roads would also be traveled by tracked vehicles on the Eglin Range. Asphalt roads on Eglin AFB would not be used. Transportation issues associated with tracked vehicles primarily involve the temporary closure of HWY 98 at Wynnhaven Beach and the Hurlburt GOS.

Wynnhaven Beach: At Wynnhaven Beach, LCACs would land and offload both tracked and wheeled vehicles, and AAVs would land. The vehicles would then be staged on Eglin property on the south side of US 98 before crossing the highway. Tires or rubber mats would be placed across the highway prior to the crossing to prevent damage to the asphalt surface. After the convoy has crossed the highway, the tires or rubber mats would be removed, and any mud/dirt debris on the road would be cleared (swept).

The Proposed Action involves closing US 98 at Wynnhaven Beach six times within a 10-day ARG/MEU training event for a duration of 30 minutes per closure.

Hurlburt GOS: The Hurlburt GOS crosses US HWY 98 two miles east of the entrance to Hurlburt Air Field. LCACs and LCUs would land and offload tracked and wheeled vehicles. Tracked vehicles would be loaded onto low-boy trucks for transport. The vehicles would then be staged on the south side of US 98 before crossing the highway. The Proposed Action would require closing US 98 at Hurlburt Landing (Crossing 2) six times within a 10-day ARG/MEU training event for 15 minutes.

The temporary impacts would include:

- Reduced level of service (LOS) in both directions along US 98 from the time of closure until such time as the traffic resumes normal flow.
- Traffic backups along US 98 that may disrupt traffic trying to cross or turn left at controlled or uncontrolled intersections.
- Potential congestion on local streets and at local street intersections near Wynnhaven Beach.
- Traffic backups on White Point Road.

The following discussion summarizes how the delays and backup distances were calculated and the related technical assumptions. This summary is based on a technical memorandum dated February 14, 2003, entitled *Traffic Analysis in Support of the EA for the Amphibious Marine Expeditionary Unit Readiness Training, Eglin Air Force Base* (SAIC, 2003).

Traffic volumes for the impact analyses were determined by excluding peak hour volumes between 6 and 8 a.m. and 4 and 6 p.m. and holiday weekends and using an off-peak traffic volume at the upper end of the peak volume range. The traffic volume used for this analysis was defined as the 30th highest hourly volume, which is estimated to be 12 to 15 percent of average annual daily traffic (AADT) (AASHTO "A Policy on Geometric Design for Highways and Streets 2001"). An analysis of non-rush-hour traffic counts indicates that the highest volumes of traffic average anywhere from one-third to one-half of peak hour traffic (Highway Design Reference Guide). Consequently, the 30th highest hourly volume assumption provides a reasonable worst-case estimate for traffic during the closure periods. Actual delays and backups would be expected to be less severe due to lower traffic volumes during actual closures at less busy times and because some motorists would be expected to avoid closure periods if provided with timely notice.

Given average annual traffic volumes, the following estimates were used for the calculations:

HWY 98:

Eastbound Traffic:	1,200 vehicles per hour
Westbound Traffic:	1,075 vehicles per hour

White Point Road:

Northbound and Southbound Traffic: 575 vehicles per hour

To calculate the length of the queue (traffic backup) formed by the closures, the number of lanes in each direction were considered and assumptions were made regarding car and truck space requirements (25 feet for cars and 40 feet for trucks) and the mix of cars and trucks on the road. It was assumed that 10 percent of all vehicles were trucks.

Based on these assumptions, a 25 percent safety factor, and the time of each delay, the following initial queue lengths were calculated:

HWY 98 Crossing 1 Eastbound Lanes:	1.9 miles (375 vehicles)
HWY 98 Crossing 1 Westbound Lanes:	1.7 miles (340 vehicles)
HWY 98 Crossing 2 Eastbound Lanes:	1.0 miles (190 vehicles)
HWY 98 Crossing 2 Westbound Lanes:	0.9 miles (170 vehicles)
White Point Road (Either Direction):	0.6 miles (125 vehicles)

To determine the time it would take to clear the expected queue or traffic backup, assumptions were made regarding the rate at which vehicles can depart from standing still combined with additional backups that would occur while the front of the queue moves forward and additional vehicles arrive at the back of the queue. A middle range value of 1,665 vehicles per lane per hour was assumed for the vehicle departure rate, and a series of calculations were made to determine the ultimate delays. In summary, traffic would not flow normally for the following periods of time and the maximum approximate queue lengths would be as follows:

HWY 98 Crossing 1 Eastbound Lanes:	51 minutes	3.1 miles
HWY 98 Crossing 1 Westbound Lanes:	48 minutes	2.6 miles
HWY 98 Crossing 2 Eastbound Lanes:	26 minutes	1.6 miles
HWY 98 Crossing 2 Westbound Lanes:	25 minutes	1.4 miles
White Point Road (Either Direction):	17 minutes	1.0 miles

Seasonal variances in traffic flows of both HWY 98 and White Point Road were also considered. Figures 4-1 and 4-2 show seasonal variances in traffic flow throughout a calendar year (2001).

Seasonal Traffic Patterns

Figures 4-1 and 4-2 display seasonal traffic fluctuations for both White Point Road and US 98. As expected, the greatest traffic density occurs during the summer months on both of these corridors since they provide direct access to the area beaches. The results from the analysis of potential impacts to traffic, paired with seasonal fluctuations in traffic density, show that closures during the month of July would have the greatest potential impact while road closures in January would have the least potential impact.

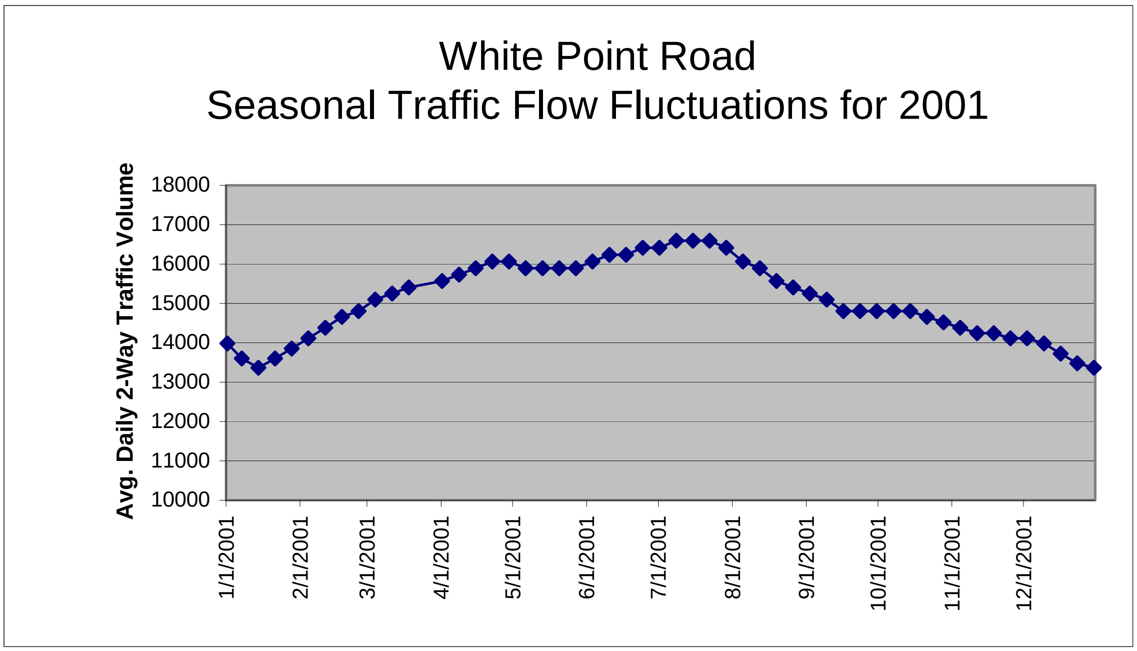

Figure 4-1. Seasonal Fluctuations in Traffic Volume on White Point Road

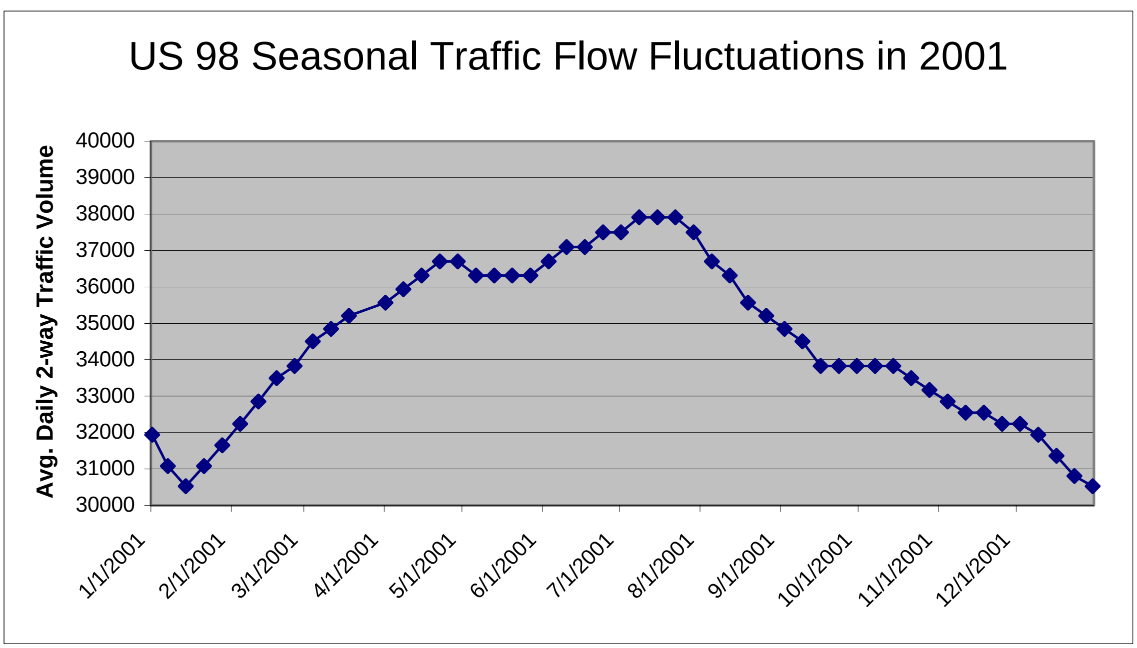

Figure 4-2. Seasonal Fluctuations in Traffic Volume on US 98

All emergency vehicles would be accommodated and allowed to pass through the crossing area. Closures of HWY 98 would not require a permit from the Florida Department of Transportation because Eglin AFB possesses an easement to cross this highway. Exercising this easement requires coordination with the Okaloosa County Sheriff's Department, and advance notification of FDOT Public Information Office and local emergency services providers in Okaloosa and Santa Rosa Counties would be required (FDOT, 2003).

By avoiding peak traffic hours and making accommodations for emergency vehicles, significant impacts will not occur.

4.1.1.3 Impacts from Aviation Operations

Eglin AFB controls 127,868 total square miles of airspace, of which 2.5 percent (3,226 square miles) is over land and 97.5 percent (124,642 square miles) is over water. Eglin supported more than 73,000 air operation sorties (an individual flight of one aircraft) during FY 2000, which were accomplished predominately over the eastern Gulf of Mexico. This over-water airspace (Figure 1-3) is referred to as the Eglin Gulf Test and Training Range (EGTTR). EGTTR is under the authority of the Federal Aviation Administration (FAA) but is scheduled and operated by Eglin AFB. The EGTTR is composed of DoD-controlled airspace and FAA-controlled airspace available on request with an established letter of agreement. This airspace includes military operations areas in Florida and southern Alabama, restricted areas in Florida, warning areas, and Eglin water test and training areas (EGTTR) over the Gulf of Mexico that extend beyond the Eglin land range boundary.

Compatible use of airspace by military and civilian interests is mandated by FAA Order 1000.1. Eglin over-land airspace appears to accommodate multiple aviation interests reasonably well, given the number of commercial and private airports and airfields within the region.

The primary users of the Eglin AFB airspace are flying units located on or near the Eglin Military Complex. Through appropriate scheduling channels, use of the ARG/MEU use of Eglin airspace is not anticipated to adversely impact aviation transportation. Under the Proposed Action, aviation operations will not create any significant impacts in terms of transportation and circulation as these operations would occur in military controlled airspace.

4.1.1.4 Impacts from Munitions Use

Under the Proposed Action, the use of munitions will not create any significant impacts in terms of transportation and circulation, as these operations would impact only restricted areas, test areas, and associated LZs. No public roads would be impacted.

4.1.1.5 Impacts from Pyrotechnics Use

Under the Proposed Action, the use of pyrotechnics will not create any significant impacts in terms of transportation impacts as these operation would impact only restricted areas, test areas, and associated LZs. No public roads would be impacted.

4.1.1.6 Traffic Management Requirements

The following measures will be implemented to address the potential temporary transportation impacts of the Proposed Action (only 4 days/year):

An overall traffic management plan will be prepared to support the Proposed Action. The plan will include:

- The actual time of road closures to avoid peak seasonal traffic volumes and A.M. and P.M. peak hour traffic volumes.
- Issue press releases that fully define the purpose and need, Proposed Action components, and the time and duration of anticipated road closures and detours to local print, radio, and television media representatives at least two weeks in advance of the first day of each 10-day exercise.
- Issue prominent public notices to be placed in local newspapers at least two weeks in advance of the first day of each 10-day exercise to inform the public of the time and duration of anticipated road closures and detours.
- Deploy temporary on-road variable electronic message signs at locations where closures are anticipated at least two weeks in advance of the first day of each 10-day exercise. Messages will specify the time and date of the anticipated closures on a continuous basis for the two week period.
- Contact representatives from all local emergency service providers, public works departments of local governments, and school districts in the vicinity at least two weeks in advance of the first day of each 10-day exercise to clarify the time and date of the anticipated closures and detours.

An overall traffic congestion and incident management plan will be made part of the project implementation plan. The plan will include:

- Coordination with law enforcement to ensure emergency vehicles are not impeded.
- Coordination with law enforcement at intersections impacted by backups so vehicles do not block travel movements through intersections.
- Definition of the content and location of fixed signs and variable messaging signs to aid and guide motorists.

Because the minimization procedures identified above will be implemented, no significant impacts to transportation from the Proposed Action will occur.

4.1.2 Alternative 1: Minimal Infrastructure Improvements

An increase in the number of MEU vehicle convoys would potentially occur, since under this alternative all tracked and wheeled vehicles would land at Santa Rosa Island. Tracked vehicles would then be loaded onto lowboy trucks and hauled over main roads onto the Eglin Military Complex. No 30-minute closures from highway crossings of tracked vehicles would occur, but

brief closures on the order of 5 to 10 minutes would be necessary at the intersection of Santa Rosa Boulevard and HWY 98 on Okaloosa Island to allow convoys to enter into traffic.

Hurlburt GOS: Tracked vehicles would arrive via LCU and LCAC at the Hurlburt GOS. Vehicles would offload and marshal at the Hurlburt GOS. Traffic would be stopped to allow tactical convoys of about 20 vehicles to proceed west to RR 259 or to cross directly onto Hurlburt Air Field. The tactical convoy would consist of about 4 tracked vehicles on lowboy trucks, 5 HMMWVs, and up to 10 other wheeled vehicles led and followed by a DOT escort. For a MEU landing, the total number of convoys leaving the Hurlburt GOS over a 15-hour period would be five. The duration of closure for each convoy would be less than 15 minutes (see Section 4.2.1 for a discussion of potential consequences of a HWY 98 closure). All total, about 20 tracked vehicles (on lowboy trucks), 25 HMMWVs, and 50 wheeled vehicles would offload and exit from the Hurlburt GOS.

Santa Rosa Island: The remaining 80 vehicles would land at Santa Rosa Island in four waves of 20 vehicles. Each landing would proceed to the reservation as a convoy. Based on anticipated usage scenarios of test areas, it is estimated that one wave would proceed to the east side of the reservation and three convoys would use routes leading to the west side of the reservation. To gain access to the east side of the reservation from Santa Rosa Island, a convoy would take Santa Rosa Boulevard to HWY 98, turn north on Eglin Parkway, enter into Eglin AFB, exit the base onto HWY 20, and either turn north along HWY 285 or proceed along HWY 20 until reaching Range Road in Bluewater Bay. To enter the west side of the reservation, convoys would proceed from Santa Rosa Boulevard to HWY 98, north on Beal Parkway/Lewis Turner Boulevard, through Fort Walton Beach, and north on RR 234, or alternately the convoy would proceed from HWY 98 onto Eglin Parkway, north onto Lewis Turner Boulevard and then north on RR 234. The convoy would then travel up Range Road 234 to Range Road 253 to gain access to Test Areas, B-70, B-75 or surrounding areas.

As stated above, the driving of the wheeled vehicles and the trucking of the tracked vehicles from the Santa Rosa Island landing site would occur in convoys. In total, three convoys with approximately 20 vehicles each would be driven from Santa Rosa Island to the mainland reservation. While the convoys themselves would not cause a road/highway/street closure under this alternative, traffic patterns would be disrupted as traffic stoppages will be implemented to allow the vehicles in each convoy to stay together at key interchanges. For example, as a convoy of 20 vehicles from Santa Rosa Island reaches the junction of Santa Rosa Boulevard and HWY 98 (just East of Brooks Bridge), traffic on HWY 98 would be stopped so that the MEU vehicles can proceed west onto the highway in single convoy, rather than being broken into separate groups by traffic light cycles. This scenario is similar to that anticipated when the convoy turns from HWY 20 onto HWY 285, and from HWY 98 on to Beal Avenue in Fort Walton Beach.

At these interchanges, FDOT and/or state trooper escorts and traffic officers would be required to manage any potential alterations in the traffic flow. Additionally, some of these vehicles would be carrying live munitions while accessing the public roads. These vehicles would display appropriate placarding for carrying live munitions.

White Point: Wheeled vehicles would proceed in a convoy northeast along White Point Road (Route 294). The convoy would then turn west on SR 20, north onto Range Road, and enter onto

the reservation on Range Road 218. White Point Road bisects the commercial and residential areas of Bluewater Bay (near Niceville). The wheeled vehicles in this convoy would be carrying live munitions (see Section 4.4 for more information). Wheeled vehicles crossing SR 20 and traversing on White Point Road and Range Road would also require the assistance of military guards and local law enforcement for traffic control. Crossing SR 20 with wheeled vehicles would inevitably cause traffic slowdowns; however, complete highway closures may not be necessary. If necessary, closures of White Point Road would be brief, on the order of 5 to 10 minutes, to allow a convoy of 10 to 15 vehicles onto the road. As such, coordination with the FDOT would be not be required to secure a state road closure permit for appropriate traffic route closures for wheeled vehicles; however, FDOT would require the presence of a duty/off-duty law enforcement officer in areas of congestion, critical traffic flow, or situations that may cause hazardous conditions.

For all highway closures, the peak traffic hours of 6 to 8 a.m. and 4 to 6 p.m. would be avoided. Major tourist holidays would be avoided as well.

Significant impacts to transportation resulting from the closures of SR 20 for wheeled vehicles will not occur. The temporary impacts would include:

- LOS F in both the westbound lanes of US 98 from the time of traffic stoppages at Brooks Bridge until such time as the traffic resumes normal flow.
- LOS F in both the eastbound lanes of US 98 from the time of traffic stoppages at Eglin Parkway and Beal Parkway until such time as the convoy clears and traffic resumes normal flow.
- Traffic backups along US 98 that may disrupt traffic trying to cross or turn left at controlled or uncontrolled intersections.
- Traffic backups on White Point Road and on SR 20 as traffic stoppages east of Niceville occur as the convoys access the eastern side of the range.

4.1.3 No Action Alternative

ARG/MEU training would not be conducted at Eglin Air Force Base. Therefore, no impacts to the baseline transportation environment would occur.

4.2 SOCIOECONOMICS

Aspects of ARG/MEU training that would potentially affect the local socioeconomic environment are best analyzed collectively for all facets of the exercise. Thus, this analysis is not separated into the functional elements of MEU training (i.e. amphibious landings, ground movement, aviation operations, etc.) but addresses the effects of the entire MEU training exercise on the potentially affected socioeconomic elements of the proposed area of operations. The elements included in this analysis are population and economy, employment, tourism, commercial and recreational fishing, restricted access, and environmental justice.

4.2.1 Proposed Action

Population and Economy

Under the Proposed Action, there would be no net change in the number of permanent or transient military in the Okaloosa, Santa Rosa, and Walton county area. Consequently, there would be no changes to the population structure or dynamics as a result of the MEU training. Between 2,000 and 3,000 active duty Marines would be introduced to Eglin in each of the 10-day MEU training cycles; however, there would be no impact to the local population because they will be either on Eglin conducting training operations or on ships in the Gulf.

Under the Proposed Action, there would be a short-term beneficial economic impact of the MEU training as during the Non-combatant Evacuation Operations (NEO), Marine personnel would use commercial establishments including rental cars and hotel rooms (and at times, commercial air travel through local airports). Also, local contractors would be hired to implement the various infrastructure/site improvements at proposed landing areas and roads, and some slight benefit to the economy would be realized from this.

Employment

There would be no shift in employment trends as a result of the Proposed Action because no *permanent* new military activities would be occurring in the Eglin area.

Tourism

Tourism is a major part of the economy of the study area. The number of tourists and the fiscal benefits to area businesses from tourism would not be expected to decrease as a result of ARG/MEU training at Eglin, but traffic delays would potentially impose declines in levels-of-service provided to tourists. As a result, ARG/MEU training that requires the closure of US 98 and SR 20 would strive to avoid holiday weekends when tourism is at its highest.

Commercial and Recreational Fishing

Considering the small size of the operating areas required for clearance preceding and during a MEU training event that involves amphibious landings, and given the short amount of time required for each landing event, MEU training and operations would not regularly interfere with commercial and recreational fishing activities. NOTMARs stating the location and duration of the proposed operations would be provided in advance, which would allow fishing boats to select alternate routes and destinations. Any fishing vessels or other craft approaching a Navy ship will be directed to maintain a standoff distance of 500 feet. Other than this standoff distance, waters of the Gulf of Mexico, Santa Rosa Sound, and Choctawhatchee Bay would remain accessible to the public. Thus, significant socioeconomic impacts to commercial and recreational fishing will not occur from the Proposed Action.

Restricted Access

Commercial transportation in both the Gulf of Mexico and the Gulf's Intracoastal Waterway may be temporarily interrupted in local areas due to the USMC's MEU training exercises and amphibious landings at Santa Rosa Island, Wynnhaven Beach, White Point, TA D-84, and

Hurlburt GOS. On the reservation, the actual area of restriction is difficult to estimate since exact locations and movements of some of the troops and their objectives are variable. The duration of restriction is also difficult to calculate since some MEU activities may have overlap and there is insufficient data available at the present time regarding coordination between events. However, it is anticipated that closures of particular areas would be relatively brief based on the duration of MEU training activities.

4.2.1.1 Impacts from Amphibious Landing

Amphibious landings involving LCACs, LCUs, AAVs, and Zodiac boats would occur at all land-water interface sites. The impacts of these activities on access restrictions are discussed below.

Small Boat Landings

Small boat landings would occur along Yellow River, at East Bay Point, Hammock Point, Alaqua Point and White Point. Waters off of Hammock Point and White Point are listed as prohibited in the *U.S. Coast Pilot*; thus, nonmilitary vessels are technically not allowed in this area at any time. The Yellow River does not require closure nor can closure be accomplished since the U.S. Air Force does not control both banks of the river.

LCUs

LCUs would potentially land at Santa Rosa Island and the Hurlburt GOS. There would be up to 30 LCU landings at Hurlburt during the 10-day training period. During the LCU landings, restricted and prohibited areas in Santa Rosa Sound would be activated and the area would be cleared of non-ARG/MEU vessels.

AAVs

AAVs would land at Wynnhaven Beach (crossing Santa Rosa Island). Access restrictions would be employed as described above for the LCU. Coordination with Florida Fish and Wildlife Conservation Commission will be required for short-duration restricted access during AAV crossings from Santa Rosa Island to Wynnhaven Beach.

LCACs

LCACs would participate in amphibious landings at Wynnhaven Beach (crossing Santa Rosa Island), the Hurlburt GOS, Hammock Point, Alaqua Point, and White Point. At each of these locations, the access restrictions would be identical to those described for the LCU. NOTMARs would be required in the Intracoastal Waterway and the Gulf. Waters off of Hammock Point and White Point are listed as prohibited in the U.S. Coast Pilot; thus nonmilitary vessels are technically not allowed in this area at any time and a NOTMAR would not be required. Coordination with Florida Fish and Wildlife Conservation Commission will be required for short-duration restricted access during AAV crossings from SRI to Wynnhaven.

4.2.1.2 Impacts from Ground Movement

In addition to transportation and circulation impacts (as previously described), ground movement of vehicles and troops during the MEU training would impact public access to recreational areas on the reservation. Approximately 200 to 300 troops would be involved in any given training exercise at any given activity area over the 10-day period. Ground movement would occur virtually over the entire expanse of Eglin Reservation (Figure 2-1).

Table 4-1 enumerates the total possible number of vehicles participating in ground movement during the MEU training.

Table 4-1. Vehicles Involved in Ground Movement

Vehicle Type	Number
LAVs	15
HMMWVs	103
7-ton trucks	35
M-198 towed howitzers	6
M1A1 tanks	4
Earthmovers	2
Bulldozers	2
Fuel trucks	2

Military lands are open to recreational use as long as public use and safety does not interfere with the military mission. The use of reservation lands for mission activities is a higher priority. The Sikes Act authorizes and encourages Air Force bases to open areas for outdoor recreation and requires the Air Force to manage the natural resources of reservations to provide for sustained multipurpose use. The guidance provided in Air Force Instruction 32-7064 states that the right to enter Eglin AFB may be revoked for any reason determined to be necessary or advantageous to the United States Air Force (U.S. Air Force, 1996a). In general, ground movement of vehicles and troops in not expected to cause closures of recreational areas as the ground movement would take place on interior reservation test areas (following the amphibious and helicopter landings).

Acreage of restricted access cannot be accurately estimated because exact locations of troop and vehicles movements are unknown. Figure 2-1 gives a basic mission overview and shows ground movement across the reservation. Additionally, some training activities would take place in one area of the range, while another would take place in a different area simultaneously. Whether or not events in different areas run consecutively is another consideration for determining restricted access due to ground movement. Not all acreage may have to be restricted at once, and some areas may not have been restricted at all.

4.2.1.3 Impacts from Aviation Operations

Under the Proposed Action, aviation operations would include helicopter raids and landings as well as close air support and rapid refueling events.

Helicopters

As previously discussed, there are four types of rotary-wing aircraft intended for use under the Proposed Action. These are the AH-1, CH-46, the CH-53, and the UH-1N. Helicopters would be used to carry troops, vehicles, artillery, and other administrative supplies (including food, water, and other supplies) to locations throughout the Eglin Reservation. Helicopter LZs are depicted in Figure A-3. The impact of helicopters on public access restrictions will not be significant, as only a few helicopters would land in areas open for public recreation.

Fixed-Wing Aircraft

As previously discussed, there are two fixed-wing aircraft intended for use under the Proposed Action. These are the F/A-18 and the AV-8B. These aircraft would be involved in rapid ground refueling and escorting helicopter raids. Additionally, fixed-wing aircraft would orbit training exercises areas during the raids. The impact of jets on public access restrictions will not be significant, as jets would not land in areas previously open to the public. All possible jet LZs are located within currently restricted areas (Figure A-17).

4.2.1.4 Impacts from Munitions Use

As shown in Appendix H, MEU Activity Expendables, MEU training at Eglin would include a variety of munitions including various small arms, mortar firings, missiles, and rockets. The small arms (including the 25 mm) would be used at Test Area B-75. The Eglin Safety Office has safety footprints associated with the 25 mm at B-75 as this is the location used for 25 mm by the Alabama National Guard. Hellfire missiles would be restricted to Test Area C-72. Artillery and mortar firings would potentially occur at Test Area C-62, Auxiliary Field 1, and Test Area C-53 (with all impacts [target locations] located within C-52 North). In accordance with Eglin safety procedures, access would be restricted during raids and other uses of munitions on the test areas; the public would also be restricted from entering areas between artillery and mortar firing locations and impact locations (i.e., anywhere within the artillery firing and impact safety footprints). During air-to-surface bombings, the Safety office may determine that access to the entire eastern side of the reservation is restricted.

Currently, the largest known safety footprint to be imposed by the MEU training at Eglin (other than complete closure of the eastern side) would result from the firing of the M-198 towed howitzers. These guns would be towed onto Eglin reservation by 7-ton trucks from the beach landing zones (BLZs). The training objective with the howitzer is to fire it across a 10-mile range with a target area located in Test Area C-52 North. The howitzer would be fired from 10 miles north of a target area within C-52 North. For this to occur, a safety footprint could occur anywhere within a 10-mile radius around C-52 North, resulting in restricted access to these areas by both the military and the public.

4.2.1.5 Impacts from Pyrotechnics Use

Under the Proposed Action, the use of pyrotechnics will not create any significant impacts in terms of access restrictions impacts, as these operation would impact only restricted areas, test areas, and associated LZs. Blanks, flares, and smokes would be used in lieu of live fire in areas

open to public access. Areas on the reservation are not usually closed for operations involving pyrotechnics (exclusively).

4.2.1.6 Cumulative Restricted Access Impacts

Analysis of restricted access must first examine the overlap of use of state recreational and navigable water areas between the military and the public to determine whether the MEU training would significantly prevent the use of these areas by the public.

Yellow River and East Bay

The use of the Yellow and East Bay Rivers by the public and military can coincide. The Yellow River is part of a canoe trail, and the East Bay River is adjacent to a section of the Florida Scenic Trail. Preliminary reconnaissance of these areas before the commencement of training would eliminate potential mission impacts and public safety concerns. On Eglin recreational lands, outdoor recreation permit holders are notified at the time of application that closures of open lands may occur as part of the normal routine.

Gulf of Mexico and the Intracoastal Waterway (Santa Rosa Sound and Choctawhatchee Bay)

In the nearshore waters of the Gulf of Mexico and the Intracoastal Waterway, amphibious landings would required activation of the restricted area, temporarily restricting passage of boaters through areas adjacent to landing zones. Normally, passage through the restricted and prohibited areas is allowed; however, recreation within these areas is not allowed according to the *U.S. Coast Pilot*.

Peak recreational public use of the area waters occurs during the summer months with highest use during the middle of the day. Commercial transportation through the Gulf Intracoastal Waterway is relatively steady throughout the year, while commercial fishing interests are usually located in areas not used for military training. Many of the MEU training activities would occur at night when recreational usage of the waters is at its lowest.

If a training area requires closure for safety reasons, locations are restricted by road barriers and the posting of signs. The actual area of restriction is not possible to estimate since exact locations and movements of some of the troops and their objectives are not known. The duration of restriction cannot be calculated since some MEU activities may have overlap and there is insufficient data available at the present time on coordination between events.

Closing corridors to the beach landing zones would require a NOTMAR. If nonmilitary personnel were to enter into, or near, a landing zone, training activity would simply cease until the area was cleared.

Impacts to Commercial Fishing

Commercial fishing interests would not be affected as long as operational guidelines that specify the frequency of closure are followed. Potential impacts to the fishing industry would have been considered, by law, prior to the establishment of the danger zones and restricted areas as specified in the *U.S. Coast Pilot* (U.S. Department of Commerce, 1996).

Impacts to Commercial Shipping

Closures would not exceed the number specified in the *U.S. Coast Pilot*. Special operations user groups scout for nonparticipants on a real-time basis and do not routinely activate the restricted or prohibited areas. The restricted area in Santa Rosa Sound is not activated during special operations missions because these missions do not involve munitions. Barge traffic may be affected, but advance notification through NOTMARs would allow adjustment to a brief closure. Given that the duration of individual beach landing events is on the order of minutes, allowing flexibility to the closure of restricted and prohibited areas in the Sound, no significant stoppage of watercraft traffic will occur for the Proposed Action.

Impacts to Recreational Users

Recreational users of Eglin Reservation can expect some interruption in activity on the Eglin Reservation due to the MEU training. Figure 2-1 shows a mission overview of the entire MEU training effort. As can be seen in this figure, troop activity and vehicle movement would occur in areas open to the public for recreation. Eglin's Safety Office would coordinate with the Marines and AAC/EMSN prior to MEU training to determine what closures of these public access recreation areas are necessary for safety reasons due to munitions and land area usage conflicts.

Although recreation permit data are available, an estimate of actual recreational use (i.e., number of hunters utilizing the area) has not been recorded. However, it is important to note that fall hunting season may be affected by the MEU training activities on Eglin AFB. Management units normally open for hunting and other recreational activities on the reservation would be closed in order to accommodate the MEU training. Exact estimates on number of hours during each 10-day event and areas where access would be restricted are unavailable at this time. However, it is anticipated that closures could range from several hours to several days and would likely be only portions of the reservation. Even so, closures will not create any significant impacts as this represents only a small percentage of the number of days available for recreation throughout the year.

Although the MEU training events are currently unscheduled (i.e., exact calendar dates), scheduling by mid-July annually would allow the Natural Resources Branch of Eglin to publish known recreational/hunting area closures in their hunting and regulation mapping product. This approach would be the most feasible in terms of public notification. Although the mapping and regulation product goes to press by the end of July, permits do not go on sale until mid-September. There would be a "second chance" if dates could be set by mid-September to produce a supplement or sticker that could be attached to mapping and regulations issued to the recreating public. This supplement could be attached to the map and regulation product prior to being used. Once members of the public purchase recreation and hunting permits, the opportunity to give them (in hand) information is lost until the following year.

If it remains infeasible to schedule the MEU training before mid-July (as a best option), or mid-September (as a second option), the Natural Resources Branch would rely on the public using the base 24/7 information telephone line currently used to notify recreational users of the Force Protection Condition (FPCON) status. Although the public is currently required to call and obtain current FPCON status daily, users have become complacent. Utilization of the

information line alone would not ensure compliance with a short notice 10-day closure. A press release would need to be issued to local media, and a substantial amount of time and manpower would be needed to post and barricade Eglin's vast perimeter.

If all or most of the MEU training could occur in the current restricted areas, there would be very little, if any, impact to Eglin's recreational users. Impacts to recreational users are dependent on the extent, duration, and area of closure. However, military training activities have precedence over recreational users.

In addition to airspace restrictions and closures, MEU training activities would sometimes require the closure of roads within certain areas or of the entire reservation. Safety is the controlling consideration. Road closures are scheduled to minimize impact to the public by avoiding heavy traffic periods. Advanced notifications are made to the media by AAC Public Affairs Office. In a similar manner, major portions of the reservation are closed to Air Force personnel and the public on a day-to-day basis depending on the missions occurring. Areas of the reservation open for recreation can be accessed by anyone holding a current recreational permit obtained through Jackson Guard (AAC/EMSN). Access to closed areas is permitted to military personnel, civil servants, and contractors if an access clearance (a "z-clearance") has been granted by the Range Operations Control Center.

4.2.1.7 Environmental Justice

Low-income or minority individuals or communities would not be disproportionately impacted socioeconomically or environmentally by the execution of military missions within the proposed MEU training areas. The Environmental Justice issues that could potentially be associated with the decision regarding the Proposed Action for the training areas are public access to the waters of the Gulf of Mexico, Santa Rosa Sound, Choctawhatchee Bay, East Bay, and the Yellow River, public access to recreation areas on Eglin Reservation, noise from increased operations, and safety from live fire operations. Figure A-18 in Appendix A shows the minority/low income and demographic data for the area derived from 2000 Census data.

The access of the public to the water areas and land recreation areas during mission activities is restricted regardless of socioeconomic status for safety and security reasons and does not disproportionately impact individuals or communities of concern. In the amphibious landing areas, closures do not currently occur during the majority of military activities, rather military activities are ceased if a non-participant enters the area. Any increase in noise would primarily affect communities along the waterfront and Eglin boundaries. Live fire exercises present potential increased safety issues but would be managed by activation of safety footprints.

4.2.2 Alternative 1: Minimal Infrastructure Improvements

There would be fewer socioeconomic benefits under this alternative. Since infrastructure improvements are fewer under this alternative, fewer local contractors would be required. Other aspects of the socioeconomic environment (i.e., restricted access, commercial and recreational fishing, and tourism) would not change under this alternative.

4.2.3 No Action Alternative

MEU training would not be conducted at Eglin Air Force Base. Therefore, no impacts would occur.

4.3 NOISE

Concerns regarding noise relate to certain potential impacts such as hearing loss, non-auditory health effects, annoyance, speech interference, sleep interference, and effects on domestic animals, wildlife, structures, and historic and archaeological sites.

This environmental assessment considers noise associated with a Marine Expeditionary Unit (MEU) conducting readiness training on and around Eglin AFB, Florida. This training would include amphibious operations and landings, ground movement of troops and equipment, fixed- and rotary-wing aircraft operations, and the use of various types of ordnance.

Based on numerous sociological surveys and recommendations of federal interagency councils, the most common benchmarks for assessing environmental noise impacts are a Day-Night Average Sound Level of 65 dBA for A-weighted noise, and 62 dBC for C-weighted noise. Noise resulting from most transportation and other daily human-related activities is measured on the A-weighted scale. Impulsive noise, such as that resulting from gunfire or explosions, is measured on the C-weighted scale. These noise level thresholds are often used to determine residential land use compatibility and risk of human annoyance. In general, when exposed to less than the noise levels identified above, land uses are unrestricted. As noise levels increase above these levels, some land uses become incompatible. Several other noise levels are also useful in assessing environmental impacts:

- A Day-Night Average Noise Level of 75 dBA is a threshold above which effects other than annoyance may occur. It is 10 to 15 dBA below levels at which hearing damage is a known risk (OSHA, 1983). However, it is also a level above which some adverse health effects cannot be categorically discounted.
- A Sound Pressure Level (SPL) of 140 dBP (maximum acoustic pressure in decibels) has been identified by the U.S. Department of Labor, OSHA, as a maximum recommended unprotected exposure level necessary to prevent physiological damage to the human ear drum (29 CFR Ch. XVII § 1926.52[e]).
- An SPL less than 115 dBP has been shown to cause minimal public annoyance resulting from the noise (Russell, 2001, pers. com.).

Public annoyance is often the most common impact associated with exposure to elevated noise levels. When subjected to Day-Night Average Sound Levels of 65 dBA, approximately 12 percent of persons so exposed would be "highly annoyed" by the noise. At levels below 55 dBA, the percentage of annoyance is correspondingly lower (less than 3 percent). The percentage of people annoyed by noise never drops to zero (some people are always annoyed), but at levels below 55 dBA, it is reduced enough to be essentially negligible. When subjected to Day-Night Average Sound Levels of 62 dBC, approximately 15 percent of persons so exposed would be "highly annoyed" by the noise (CHABA, 1981).

Noise impacts are normally assessed as those occurring during a "typical day" averaged from a year's events. This is to minimize either overstating or understating noise impacts. However, in the case of the MEU exercise, to average 10 days of activity over a year would result in a significant understatement of noise impacts. Therefore, for this assessment, individual events are assessed for a single day, as though they occurred on each day of a year. This provides a realistic assessment of the noise exposure that would result on the day the exercise was conducted. While it is recognized that the exercise(s) is temporary and transient, this method of assessment correctly reflects the public's noise exposure (if applicable) to exercise noise on that particular day.

The scope and intensity of the proposed MEU training varies over the 10-day exercise period. To analyze the potential environmental effects associated with each major type of activity, "typical" scenarios for individual training events were developed and quantified in terms of persons involved, equipment used, and expendables consumed. The 17 proposed events were described in Section 2. The major noise-producing events associated with these activities include the use of aircraft, use of the LCAC and AAV, and live-fire exercises.

Since there are always uncertainties associated with scheduling and exercise scope, it is important to note that all of the assessments below are based on day-equivalent events. As previously discussed, penalties are assessed for noise events that occur between the hours of 10:00 P.M. and 7:00 A.M. Thus, one night event would be equal to 10 day events. Additionally, each event has been normalized to consider a reasonable level of activity that would occur during one hour. Therefore, the noise levels presented for each event are 1-hour equivalent noise levels [$L_{eq(1)}$]. Also, to facilitate subsequent estimations of Day-Night Average Noise levels involving multiple events, or multiple participants in a single event, the values normalized to a 24-hour period [$L_{eq(24)}$] are also presented.

Since specific locations of many exercises are difficult to predict in advance, assessments either considered identified locations where an event would have to occur, or they considered the events in one generic location. In the latter technique, the assessment essentially formed a template that could then be located in any specific location once determined. If these conservative assessment techniques indicate little or no noise impact, then it is reasonable to assume that as events actually occur at semi-random, geographically dispersed locations, effects would be less.

Based on the general evaluative procedures described above, it must be highlighted that the noise levels presented below do not represent the noise associated with a total exercise. However, when actual total exercise times and scope are determined, estimated noise levels can be appropriately scaled to reflect actual estimates applicable to a specific activity. This process is summarized below and described in detail in Appendix J.

Environmental noise impacts are normally discussed in terms of Day-Night Average Noise Levels, i.e., the averaged level of noise that occurs during a 24-hour period. If the 10 decibel (dB) night penalty is ignored for the moment, the 1-hour equivalent noise levels reported in subsequent tables can be normalized to 24-hour equivalent noise levels using the values shown in Table 4-2. Since an 8-hour equivalent noise level is often of interest, values for that time duration are also shown.

Table 4-2. Equivalent Noise Level Conversion Values

Time Factor	Adjustment Value
1-Hour [$L_{eq(1)}$]	As Shown
8-Hour [$L_{eq(8)}$]	-9.0 dB
24-Hour [$L_{eq(24)}$]	-13.8 dB

The second method used to assess actual operations (accounting for full scope) is referred to as the "equivalency process." This entails determining a noise standard and then calculating an "equivalent operation" from the determined noise. The equivalent operation value represents that noise level's contribution to the target noise level. After applying applicable multipliers to the single equivalent operation, the resultant value can be converted back to a Day-Night Average Noise Level. This process is presented in detail in Appendix J.

Sound Exposure Levels

Sound exposure levels (SELs) represent noise from a source normalized over 1 second. SELs for ARG/MEU ships, amphibious craft, and vehicles are presented in Table 4-3.

Table 4-3. ARG/MEU Equipment Noise Levels

Equipment	SEL at 100 Feet (dBA)	SEL at 200 Feet (dBA)	SEL at 400 Feet (dBA)
LCU at Idle	72	66	60
LCU Moving	86	80	74
AAV at Idle	73	67	61
AAV Moving at Sea	88	82	76
AAV Moving on Land	74	68	62
LCAC at Idle	74	68	62
LCAC Moving	104	98	92
Heavy Truck at Idle	72	66	60
Heavy Truck Moving	76	70	64
LAV at Idle	64	58	52
LAV Moving	80	74	68
Bull Dozer at Idle	65	59	53
Bull Dozer Moving	83	77	71
HMMWV at Idle	52	46	40
HMMWV Moving	62	56	50
7-Ton Truck at Idle	72	66	60
7-Ton Truck Moving	76	70	64
Towed Howitzer at Idle	72	66	60
Towed Howitzer Moving	76	70	64
Tank at Idle	67	61	55
Tank Moving	87	81	75

4.3.1 Proposed Action

4.3.1.1 Impacts from Amphibious Landing

The greatest noise associated with amphibious landings would be expected to occur at Wynnhaven Beach and Santa Rosa Island. Given the proximity of potential receptors (e.g., people) impacts would be greatest at Wynnhaven Beach and White Point. Private residences are located approximately 560 feet to the west of the center of the Wynnhaven Beach landing site and 480 feet to the east of the center of the landing site. Cabins of the Maxwell-Gunter Recreational Area, a DoD recreation area located at White Point, are approximately 670 feet from the proposed White Point landing area. In order to assess these activities, the following scenario was developed:

- An "exercise area" was described that started approximately 8,000 feet at-sea from the beach, included the beach area, and continued 3,000 feet inland from the beach, along the expected line of advance. This area covered a frontal width of 1,500 feet.
- It was assumed that the actual activity would occur in successive waves, and as one wave was clearing the beach and moving inland, the succeeding wave would approach the beach.
- It was assumed that each wave's processing in the defined exercise area would take approximately one hour.

Although it is recognized that not every wave would contain the same equipment, in order to ensure a conservative assessment, the calculated wave consisted of the equipment shown in Table 4-4.

Table 4-4. Amphibious Landing Wave Composition

Equipment Item	Number	Equipment Item	Number
LCAC	2	M1A1 Tank	1
AAV	5	Front-End Loader	1
LCU	1	Bulldozer	1
LAV	5	Truck	1
HMMWV	10	Towed Howitzer	1
7-Ton Truck	3		

The total exercise area developed was 1,500 feet wide and 11,000 feet deep (16,500,000 square feet, or approximately 0.6 square miles).

The first step in the analysis was to calculate the total acoustic energy that would be generated in this exercise area. Next, the operations of all of the wave's components were spatially distributed throughout the area considering "most likely" areas of operation. This yielded a spatially weighted contribution to total area acoustic energy at different points. With this spatial distribution scaled on axes bisecting the area (in this case, a north-south axis and an east-west axis), it was then possible to calculate a mean and standard deviation for the distribution of noise along each axis.

These data were then used to calculate a standard normal distribution and "allocate" acoustic energy to points along each axis. Finally, the normally distributed energy from multiple source points throughout the site was aggregated at specific points at given distances from the site edges. These edges are identified as the "leading edge" and the "lateral edge." The "leading edge" represents the "front" of the area, or the general direction in which the assault is moving (line of advance). The edges of the rectangle to the left and right and at 90 degrees to the leading edge are the "lateral edges." The aggregated noise levels at the receptor points represent the distributed noise that had emanated off the exercise area in each direction.

Table 4-5 reflects aggregated noise levels at a range of distances from the indicated edges of the exercise area. Shown are the calculated noise levels and equivalent operations resulting from one operation in a 1-hour period [$L_{eq(1)}$] and a 24-hour period [$L_{eq(24)}$].

Table 4-5. Noise From Amphibious Landing (One Exercise Wave) In A-Weighted Decibels

Distance (In Feet)	**Leading Edge**		**Lateral Edge**	
	$L_{eq(1)}$	**Equivalent Operation**	**$L_{eq(1)}$**	**Equivalent Operation**
500	68.7	2,344.2	76.7	14,791.1
1,000	65.3	1,071.5	72.7	5,888.4
2,000	62.1	512.9	68.2	2,089.3
3,000	60.2	331.1	65.4	1,096.5
	$L_{eq(24)}$	**Equivalent Operation**	**$L_{eq(24)}$**	**Equivalent Operation**
500	54.9	97.7	62.9	616.6
1,000	51.5	44.7	58.9	245.5
2,000	48.3	21.4	54.4	87.1
3,000	46.4	13.8	51.6	45.7

It is estimated that the full MEU amphibious landing would be accomplished in five waves. However, not all waves would include all of the equipment considered above due to the total number of specific vehicles available. Therefore, in order to estimate the total impact of the full amphibious landing over a 24-hour period, 4.5 waves were considered. The estimated $L_{eq(24)}$ noise levels at varying distances from the exercise area associated with the full exercise are shown in Table 4-6.

Table 4-6. MEU Landing Exercise In A-Weighted Decibels

Distance From Exercise Area (In Feet)	**Leading Edge Noise [$L_{eq(24)}$]**	**Lateral Edge Noise [$L_{eq(24)}$]**
500	61.4	69.4
1,000	58.0	65.4
2,000	54.8	60.9
3,000	52.9	58.1

Wynnhaven Beach

Currently, ambient noise levels at Wynnhaven Beach are dominated by traffic noise and existing aircraft operations noise. Aircraft operations noise range from 55 to 60 L_{dn} annually. Traffic

noise at the site ranges from 70 to 75 L_{dn}. The annual average noise of the ARG/MEU landings would be much lower than either current traffic or current air operations given that this event would only occur twice a year, whereas traffic and aircraft overflights are an ongoing and regularly occurring activity.

Private residences on either side of the proposed MEU landing site at Wynnhaven Beach would be exposed to about 69 dB averaged as over a 24-hour period [$L_{eq(24)}$] and the majority of noise would be generated by LCACs coming ashore. At most, two LCACs would land at any one time. Where $L_{eq(24)}$ provides a measure of all noise over time, sound exposure levels (SEL) provide a measure of all noise energy of a particular event compressed to 1 second, though as with LCAC operations the actual duration of the event is longer than 1 second. If the sound from two LCACs coming ashore is considered together (Table 4-7), SEL would be less than 95 dBA at the nearest east and west residence. Once ashore, the LCACs would reduce power to idle, and SEL noise would be less than 65 dBA. For the purposes of comparison, Table 4-8 provides SELs for events with which people may be more familiar.

Table 4-7. Approximate Single Event Noise from Two LCACs

Equipment	SEL at 100 Feet (dBA)	SEL at 200 Feet (dBA)	SEL at 400 Feet (dBA)
2 LCAC at Idle	<77	<71	<65
2 LCAC Moving	<107	<101	<95

In summary, no significant noise impacts are expected to occur from the ARG/MEU landing phase of the exercise at Wynnhaven Beach. Noise at 500 feet and closer to the Wynnhaven Beach landing site would be intrusive and short-term in duration such that some annoyance to people (i.e., the closest residences) may result. However, because the duration is brief, the ARG/MEU landing would occur during the day, and training would only be conducted twice a year, the impacts would not be significant.

White Point

Cabins for the Maxwell-Gunter Recreational Area are approximately 670 feet from the proposed MEU landing site at White Point. SEL noise from two LCACs landing at this site would be about 90.5 dBA. Background noise at this site is low (about 40 to 50 L_{dn} from aircraft and vehicle noise, and noise from ARG/MEU landing events may by comparison seem loud and intrusive. Given that ARG/MEU training would occur at most twice a year, the impacts would not be significant. Table 4-8 provides a comparison of SELs from everyday noise events.

It should be noted that noise data developed for a single wave of the MEU landing would be applicable for the amphibious landing associated with a wet mechanized raid, which would occur at Santa Rosa Island, Wynnhaven Beach, and White Point.

Table 4-8. Typical Sound Levels Measured in the Environment

At a Given Distance (ft) from Noise Source	A-Weighted Sound Level in Decibels	Noise Environments	Subjective Impression
	140		
Civil defense siren (100')			
	130		
Jet takeoff (200')	120		Pain threshold
	110	Rock music concert	
Pile driver (50')	100		Very loud
Ambulance siren (100')			
	90	Boiler room	
Freight cars (50')		Printing press plant	
Pneumatic drill (50')	80	In kitchen with garbage disposal running	
	70		Moderately loud
Vacuum cleaner (10')	60	Data processing center	
		Department store	
Light traffic (100')	50	Private business office	
Large transformer (200')			
	40		Quiet
Soft whisper (5')	30	Quiet bedroom	
	20	Recording studio	
	10		Threshold of hearing
	0		

Source: U.S. Department of Housing and Urban Development, 1985.

4.3.1.2 Impacts from Ground Movement

Noise resulting from various exercises involving ground movement of the MEU was estimated using generally the same techniques as those used for amphibious landings. However, for these exercises, the defined exercise area was more spatially constrained. For these exercises, the area developed was 1,500 feet by 1,500 feet. Noise levels resulting from a dry mechanized raid are shown in Table 4-9.

Table 4-9. Mechanized Raid (Dry) In A-Weighted Decibels

Distance (In Feet)	Leading Edge		Lateral Edge	
	$L_{eq(1)}$	Equivalent Operation	$L_{eq(1)}$	Equivalent Operation
500	60.5	354.8	61.0	398.1
1,000	57.2	165.9	57.3	169.8
2,000	52.9	61.6	52.9	61.6
3,000	50.1	32.3	50.1	32.3
	$L_{eq(24)}$	Equivalent Operation	$L_{eq(24)}$	Equivalent Operation
500	46.7	14.8	47.2	16.6
1,000	43.4	6.9	43.5	7.1
2,000	39.1	2.6	39.1	2.6
3,000	36.3	1.3	36.3	1.3

No significant noise impacts are expected to occur from conducting this phase of the exercise.

4.3.1.3 Impacts from Aviation Operations

There are two general sources of aircraft noise. One consists of helicopters used for exercises in which troops and equipment are inserted into or extracted from an area. In some cases, fixed-wing aircraft may accompany the helicopters to provide additional air cover. In these exercises, the aircraft are generally flying tracks from one point to another. However, in the second case, aircraft engaged in an exercise may fly to an area and then loiter in the area for some time to provide cover and close air support to troops on the ground. To assess this noise, a representative training "area" was defined. This area was large enough to allow some measure of random flight during collective operations, but still confined enough to represent the spatial scope of training areas currently used.

For both possible scenarios, using flight times and flight profiles representative of specific operations, the Air Force's MR_NMAP model was used to calculate both noise along the centerline of the track and the uniformly distributed noise in an exercise area (Lucas and Calamia, 1996). Specific noise data for one of each aircraft associated with these missions are shown in Table 4-10. It should be noted that data presented for aircraft differ from that presented for other exercise scenarios. Model output reflects one aircraft day-operation per day; therefore, it essentially represents $L_{eq(24)}$.

Table 4-10. Aircraft Noise Data In A-Weighted Decibels

Aircraft	Track Operations		Area Operations	
	L_{dnmr} / $L_{eq(24)}$	Equivalent Operation	L_{dnmr} / $L_{eq(24)}$	Equivalent Operation
AV-8B	37.7	1.9	55.5	112.2
F-18	37.0	1.6	54.2	83.2
AH-1	40.8	3.8	58.2	208.9
UH-1	39.4	2.8	56.3	134.9
CH-46	33.6	0.7	51.9	49.0
CH-53	42.1	5.1	60.2	331.1

Aircraft noise modeled for Eglin airspace indicated an ambient 24-hour day-night average of 60 dBA for an area overlying the Wynnhaven Beach landing site and the southwestern part of the

Eglin Military Complex where some of the ARG/MEU air operations would occur (U.S. Air Force, 1996). The data in Table 4-6 suggest that noise from ARG/MEU air operations would not exceed ambient noise levels produced by military aircraft overflights. Therefore, no significant impacts are expected to result from aircraft use in the exercise.

4.3.1.4 Impacts from Munitions Use

Impulsive noise is common to the Eglin environment. Test Area C-52N, Test Area B-75, and other areas proposed for ARG/MEU training are actively used as impact areas for high explosive munitions, as well as gunnery and small arms.

Since munitions use constitutes impulsive noise and uses the C-weighted scale for assessment, it is not appropriate to add values from the munitions use assessment to values based on the A-weighted scale used to assess vehicle, vessel, and aircraft noise. Therefore, these impacts are addressed independently.

Noise impacts resulting from the use of munitions (both blanks and live-fire) result in three general areas. For small arms, impacts result from the use of small-arms ammunition during a variety of exercises. For artillery use, impacts result in two general areas: the areas associated with the firing of the weapon (muzzle blast or firing area) and the areas associated with the weapon's warhead impact and detonation (impact area). Each is described in the following tables.

For all exercises, it was assumed that the "range" and "impact" area would be more constrained, measuring 1,000 feet by 1,000 feet. To conduct a conservative assessment, all proposed activities were assessed on a single "range." It is reasonable to assume that if the collective impacts from all annual activities are minimal, then geographically dispersing them would further lessen their effect.

Impulsive noise resulting from small-arms fire during an exercise is presented in Table 4-11.

Table 4-11. Small-Arms Use During MEU Exercise In C-Weighted Decibels

Distance (In Feet)	Leading Edge		Lateral Edge	
	$L_{eq(1)}$	Equivalent Operation	$L_{eq(1)}$	Equivalent Operation
500	88.8	478,630.1	88.5	446,683.6
1,000	84.8	190,546.1	84.6	181,970.1
2,000	80.1	64,565.4	80.1	64,565.4
3,000	77.1	32,359.4	77.1	32,359.4
4,000	74.9	19,498.4	74.9	19,498.4
5000	73.2	13,182.6	73.2	13,182.6
	$L_{eq(24)}$	Equivalent Operation	$L_{eq(24)}$	Equivalent Operation
500	75.0	19,952.6	74.7	18,620.9
1,000	71.0	7,943.3	70.8	7,585.8
2,000	66.3	2,691.5	66.3	2,691.5
3,000	63.3	1,349.0	63.3	1,349.0
4.000	61.1	812.8	61.1	812.8
5,000	59.4	549.5	59.4	549.5

Considering the areas potentially used in these phases of the MEU exercises, and their geographic location, no significant noise impacts are expected to result from the conduct of these phases of the exercise.

Noise levels associated with artillery firing and impact areas are addressed in Tables 4-12 (155 mm Howitzer firing), 4-13 (mortars firing), and 4-14 (impacts), respectively.

Excessive noise from 155 mm Howitzer would not extend more than one mile from the exercise area (Table 4-12). Since the live-fire area is well within the confines of the Eglin military reservation, no significant noise impacts are expected to result from the conduct of this phase of the exercise.

Table 4-12. Noise In 155 mm Howitzer Firing Area in C-Weighted Decibels

Distance (In Feet)	Leading Edge		Lateral Edge	
	$L_{eq(1)}$	Equivalent Operation	$L_{eq(1)}$	Equivalent Operation
500	90.5	70,7945.8	90.2	660,693.4
1,000	86.5	281,838.3	86.4	275,422.9
2,000	81.8	95,499.3	81.8	95,499.3
3.000	78.8	47,863.0	78.8	47,863.0
4,000	76.6	28,840.3	76.6	28,840.3
5,000	74.9	19,498.4	74.9	19,498.4
	$L_{eq(24)}$	Equivalent Operation	$L_{eq(24)}$	Equivalent Operation
500	76.7	29,512.1	76.4	27,542.3
1,000	72.7	11,749.0	72.6	11,481.5
2,000	68.0	3,981.1	68.0	3,981.1
3,000	65.2	1,995.3	65.0	1,995.3
4,000	62.8	1,202.3	62.8	1,202.3
5,000	61.1	812.8	61.1	812.8

Table 4-13. Noise In Mortar Firing Area In C-Weighted Decibels

Distance (In Feet)	Leading Edge		Lateral Edge	
	$L_{eq(1)}$	Equivalent Operation	$L_{eq(1)}$	Equivalent Operation
500	98.4	4,365,158.3	98.1	4,073,802.8
1,000	94.4	1,737,800.8	94.3	1,698,243.6
2,000	89.8	602,559.6	89.8	602,559.6
3,000	86.8	301,995.2	86.8	301,995.2
4,000	84.6	181,970.1	84.6	181,970.1
5,000	82.9	123,026.9	82.8	123,026.9
	$L_{eq(24)}$	Equivalent Operation	$L_{eq(24)}$	Equivalent Operation
500	84.6	181,970.1	84.3	169,824.4
1,000	80.6	72,443.6	80.5	70,794.6
2,000	76.0	25,118.9	75.9	24,547.1
3,000	73.0	12,589.2	73.0	12,589.2
4,000	70.8	7,585.8	70.8	7,585.8
5,000	69.1	5,128.6	69.0	5,011.9

The assessment of live fire of mortars indicates that the $L_{eq(24)}$-day event noise level associated with this activity decays to 62 dBC or less at approximately 2.3 miles from the exercise area. Table 4-13 presents distance propagation of calculated noise from the leading and lateral edges of the firing area. Since the firing area is well within the boundaries of the Eglin Ranges, no significant noise impacts are expected to result from conducting this phase of the exercise.

Noise levels from the impact area do not decay to 62 dBC or less for one day-equivalent event until approximately 15.5 miles from the edge of the proposed impact areas. This indicates that some communities would be exposed to average noise of greater than 62 dBC for the 3-day period. While some annoyance may be experienced, this level of noise is not considered significant for two reasons. First, the 62 dBC threshold for annoyance is usually applied as a yearly average, whereas in this document a 24-hour average is used. No noticeable change would occur in yearly average noise for MEU events. A 24-hour average was calculated as a means to understand potential maximum but immediate-term noise effects. Second, even with the amount of expenditures during MEU ordnance activities, noise of 140 dBP (i.e., potentially injurious to humans) would not be allowed to leave the range. One-hour average noise and 24-hour average noise emanating from the impact area is presented in Table 4-14, though the 24-hour average is the only scientifically based threshold. Average daily noise produced at the TA C-52N ordnance impact area and the distances to various geographic locations is presented in Table 4-14.

Table 4-14. Noise In Ordnance Impact Area In C-Weighted Decibels

Distance (In Feet)	Leading Edge		Lateral Edge	
	$L_{eq(1)}$	Equivalent Operation	$L_{eq(1)}$	Equivalent Operation
500	115.0	199,526,231.5	114.7	186,208,713.7
1,000	111.0	79,432,823.5	110.9	77,624,711.7
2,000	106.3	26,915,348.0	106.3	26,915,348.0
3,000	103.4	13,803,842.6	103.3	13,489,628.8
4,000	101.2	8,317,637.7	101.1	8,128,305.2
5,000	99.4	5,495,408.7	99.4	5,495,408.7
	$L_{eq(24)}$	Equivalent Operation	$L_{eq(24)}$	Equivalent Operation
500	101.2	8,317,637.7	100.9	7,762,471.2
1,000	97.2	3,311,311.2	97.1	3,235,936.6
2,000	92.5	1,122,018.4	92.5	1,122,018.4
3,000	89.6	575,439.9	89.5	562,341.3
4,000	87.3	338,844.2	87.3	338,844.2
5,000	85.6	229,086.8	85.6	229,086.8

Ordnance impact noise over a three-day period would temporarily reach potentially annoying levels at various levels, but do not represent a significant impact to any community. Table 4-15 presents exposure for several geographic locations exposed to a daily average noise level of 62 dBC or greater.

Table 4-15. Average Daily Noise from SACEX Ordnance Impacts

TA C52N Impact Area		
Location	**Approximate Distance from Impact Area (ft)**	**Daily Noise Exposure for Ordnance $L_{eq(24)}$**
Niceville	52,370	65.9
Valparaiso	57,000	65.2
Center of Eglin Main Base	73,790	63.0
Choctaw Beach	39,060	68.4
Seminole/Bluewater (edge of reservation boundary)	39,160	68.4
Destin (shore of Choctawhatchee Bay)	74,200	62.9
Sandestin (shore of Bay)	66,380	63.9
Freeport	64,000	64.2
Center of Duke Field	70,450	63.4

4.3.1.5 Impacts from Pyrotechnics

There are several proposed exercises during which various pyrotechnics would be employed. Pyrotechnics do contain explosive charges. However, since the greatest and highest noise levels dominate calculations of acoustic conditions, other activities associated with the exercises would be expected to be the dominant noise sources. Therefore, the use of pyrotechnics, in and of itself, would be expected to have very little, if any, impact on the noise levels associated with MEU exercises. Simulators contain minimal amounts of explosive (one pound or less) and would not contribute substantially to the overall noise produced from ARG/MEU activities.

4.3.1.6 Summary Noise Assessment

Several aspects of the ARG/MEU readiness training have the potential to create noise that may be disturbing or annoying but not harmful to receptors located beyond Eglin Military Complex boundaries. While some noise events (i.e., from MEU landings) may be accurately described as intrusive and potentially annoying to people, no USEPA noise thresholds would be exceeded and no change to annual average noise levels would occur. The short-term duration of these events and the infrequent occurrence of this ARG/MEU readiness training would not result in significant noise impacts to the community. Concerns with regard to disturbance of sensitive species have been identified, and management practices would be followed in order to comply with the Endangered Species Act.

4.3.2 Alternative 1: Minimal Infrastructure Improvements

Potential noise impacts from amphibious operations would be substantially less under this alternative, given that Wynnhaven Beach and White Point would not be used for MEU landings. Noise from air operations, munitions, and vehicles would not differ substantially from the Proposed Action.

4.3.3 No Action Alternative

MEU training would not be conducted at Eglin Air Force Base. Therefore, no impacts would occur.

4.4 SAFETY

The primary safety issue concerns the health and welfare of personnel training within areas where UXO may occur. No safety issues to the public are anticipated since the public would not be allowed within the MEU training areas. During MEU training exercises, waterways, roadways and Eglin interstitial areas would be closed as necessary to ensure the safety of the public. AAC safety procedures will be followed while on the Eglin Reservation except where USMC procedures are more restrictive.

4.4.1 Proposed Action

4.4.1.1 Impacts from Amphibious Landing

There would be no safety impacts from amphibious landings since the actual landings would occur on military property and waterways would be temporarily closed to ensure the safety of the public.

4.4.1.2 Impacts from Ground Movement

With respect to the Proposed Action, UXO encountered during Ground Movement and Munitions Use (e.g., SACEX and Live Fire) is primarily a safety issue for the MEU training participants. In accordance with Eglin AFB's current method of operation, AAC/SE would determine the risk from UXO and emplace control measures based on an informal analysis of the action and anticipated risk factors. Consequently, AAC/SE would need to analyze any new action with respect to risk from UXO. Potential impacts to human safety would be minimized through this process.

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Environmental impacts are associated with UXO, as chemical materials may be deposited intact if the munition item fails to function as designed. It is likely that UXO would be produced from the expenditures as the typical "dud" rate or bomb failure rate for ordnance ranges from 5 to 10 percent (U.S. Air Force, 2003b, pers. comm.). Table 4-16 shows the potential for UXO contamination based on a 10 percent dud rate.

UXO is present on Test Area (TA) C-52N, which may be described as heavily contaminated. An explosive ordnance disposal (EOD) escort is required on some areas of C-52N. The Explosive Ordnance Disposal Flight, 96th CED/CEG, at Eglin AFB is responsible for providing support for UXO cleanup. Based on the current use of TA C-52N and procedures outlined for UXO cleanup, it is not anticipated that additional training activities from SACEX would substantially increase safety risks from UXO.

Table 4-16. Potential UXO Contamination - SACEX

Munition	Quantity of Munitions Expended	Potential UXO (10% dud rate)
60 MM HE	500	50
60 MM ILLUM	75	7.5
81 MM SMK RP	200	20
81 MM ILLUM	200	20
81 MMHE	800	80
155 MM ILLUM	200	20
155 MM HE	500	50
CHG, PROP, 155 MM GB	700	70
Rockets-2.75, 5.0	72	7.2
Missiles-HELLFIRE, TOW	6	0.6
20 mm	1,500	150
7.62 mm	9,000	900
MK 76	30	3
MK 82	24	2.4
MK 83	12	1.2
MK 84	6	0.6
25 mm	500	50

4.4.1.3 Impacts from Aviation Operations

MEU Aviation Operations would occur in U.S. Air Force controlled airspace. No public safety impacts are anticipated.

Bird-aircraft strikes and the hazards they present are a safety concern that the Air Force addresses through the Bird Aircraft Strike Hazard (BASH) Reduction Program. The goals of the program are to reduce bird strikes through awareness, bird control, bird avoidance, and aircraft design. The Air Force uses a bird avoidance model, which incorporates past strike information, bird migrations and flight patterns, to minimize the potential for bird strikes, which can result in loss of aircraft or human life. More than 95 percent of bird-aircraft strikes occur at altitudes below 3,000 feet above ground level (AGL), and most of these occur near airfields (U.S. Air Force, 2001). ARG/MEU aviation operations would not differ from typical ongoing aviation operations in terms of routes or numbers of aircraft, and an increase in bird strikes is not anticipated.

4.4.1.4 Impacts from Munitions Use

Wildfire events would likely increase from munitions (and pyrotechnic) use. Once a fire is started, it can spread to adjacent forested buffer zones. The fires are either extinguished or allowed to burn under control if they may have any beneficial effects. Wildfires have decreased on Eglin since 1986. The numbers of wildfires have decreased because of fire management practices such as prescribed burns, which decrease fuel availability for wildfires. On an average annual basis between 1990 and 2000 about 109 wildfires occur each year on or near the Eglin Reservation, burning an average of approximately 8,300 acres per year (U.S. Air Force, 2001a). Potential safety impacts associated with wildfires pertain to the potential for smoke to impede roadways and safety concerns for the public and for military personnel.

Using existing wildfire information from similar troop movement exercises at Ft. Stewart and Camp LeJeune that involve munitions and pyrotechnics, Eglin Natural Resources estimated the potential increase in wildfire starts from ARG/MEU exercises. Approximately 14 new wildfire starts per year may be expected from ARG/MEU training. A wildfire operational plan would be required to ensure adequate coordination between ARG/MEU participants and Eglin Natural Resources in the event of a wildfire; in addition, the observance of existing fire management protocols will be enforced, and pyrotechnics and tracer use would be restricted on high fire index days. For ARG/MEU training, Eglin Natural Resources wildfire management personnel will be on hand to respond to any fires. Considering these factors, the potential for significant safety impacts to the public associated with wildfires is minimal.

4.4.1.5 Impacts from Pyrotechnics

Pyrotechnic use would potentially increase the number of wildfires at Eglin AFB. Analysis for pyrotechnics is presented collectively with munitions in the preceding section.

4.4.2 Alternative 1: Minimal Infrastructure Improvements

The primary safety issues pertaining to the health and welfare of Marines would not differ under this alternative from the Proposed Action.

4.4.3 No Action Alternative

MEU training would not be conducted at Eglin Air Force Base. Therefore, no impacts would occur.

4.5 SOILS/EROSION

Soil erosion is the primary focus of this analysis. Surface erosion becomes particularly problematic when disturbance activities are in proximity to waterways. Eroded soil that leaves the site of origin and enters streams becomes sediment, which is considered by regulatory agencies as a non-point source of pollution (NPS). Sedimentation is identified as a major source of NPS impairment in U.S. waterways. Excessive sedimentation results in destruction of fish habitats, decreased recreational uses, and loss of water storage capacity. From a water quality standpoint, the relationship between gross erosion (loss of soil from a section of land) and sediment yield (loss of suspended solids from the watershed) is complex; changes in erosion do not necessarily translate simply into changes in sediment yield.

Overall, nonrenewable soil loss occurs when soil erosion rates (the movement of soil from its point of origin) exceed soil formation rates. Lost with the moving topsoil are chemical compounds and materials, which may result in diminished site fertility and productivity. This negatively impacts the ability of vegetation to grow and establish itself. The sensitive slope areas occur along riparian units and shorelines, which reflect the destination of sediment. The riparian units tend to redistribute sediment along the side slopes and deposit sediment into streams, with portions of these sediments eventually being transported along the length of the streambed.

The main components of an erosion analysis are the soil type and vegetative cover of the area in question, the topography of the area, and the type of activity taking place in the area. Analysis therefore focuses on the elements associated with the MEU training activities and their location and associated soil types, vegetative cover, and topography. While difficult to quantify, the potential for erosion to occur can be evaluated qualitatively and minimization procedures can be identified that would reduce the potential for adverse impacts from erosion. The main elements of MEU training that could potentially create erosion are amphibious landings along the shoreline and ground movement of troops and vehicles across the island, mainland reservation interstitial areas, and test areas.

4.5.1 Proposed Action

4.5.1.1 Impacts from Amphibious Landings

Table 4-17 shows the relationship between amphibious landings and land-water interface locations under the Proposed Action that may affect soils and erosion. Large-craft vehicle numbers are based on the following assumptions:

- Potential maximum usage of Santa Rosa Island is 100 percent of MEU force.
- Potential maximum of LCAC landings and approximately 20 percent of the troops and wheeled vehicles would land at Hammock and/or White Points.
- Potential maximum use of East Bay Point would be only about 5 percent of MEU LCACs, troops, and wheeled vehicles.
- Potential maximum landings of LCACs at Hurlburt Field could involve 100 percent utilization of MEU assets if tracked vehicles were trucked to locations on Eglin Reservation.
- No Mechanized Raid Wet activities with tracked vehicles at Wynnhaven Beach.
- No tracked vehicles (AAVs) at Hurlburt Field.
- No tracked vehicles (AAVs) at East Bay Point.
- No tracked vehicles (AAVs) at Hammock or White Points.

Table 4-17. Amphibious Landings by Location

<table>
<tr><th rowspan="2">Location</th><th colspan="4">Vehicle</th><th rowspan="2">Improvements Needed</th></tr>
<tr><th>LCAC</th><th>Max # Potential Landings</th><th>AAV</th><th>Max # Potential Landings</th></tr>
<tr><td>Santa Rosa Island</td><td rowspan="6">✔</td><td>70</td><td rowspan="2">✔</td><td>60</td><td>None</td></tr>
<tr><td>Wynnhaven Beach</td><td>65</td><td>45</td><td rowspan="5">✔</td></tr>
<tr><td>White Point</td><td>5</td><td colspan="2" rowspan="4">N/A</td></tr>
<tr><td>Hammock Point</td><td>10</td></tr>
<tr><td>East Bay Point</td><td>4</td></tr>
<tr><td>Hurlburt Field</td><td>65</td></tr>
</table>

As described previously, amphibious landings involve the use of LCACs, LCUs, AAVs, and Zodiac boats at the land-water interface.

Small Boat Landings

Erosion is occurring at some boat landings on the Yellow River that are used by the military. In addition, sedimentation from a reservation access road near the Weaver River is suspected of having an effect on water level at that location. According to the Yellow River Marsh Aquatic Preserve Office, the depth of the water has decreased at that location due to the volume of sediment that has eroded into it. This type of erosion is potentially significant from an environmental point of view, but equally so from a mission impact point of view, because the decreased depth could prevent the continued use of this area for riverine training. Some erosion control measures (i.e., gravel placement) have been implemented at Carr Landing, Pine Bluff Landing, and Sweet Gum Landing on the Yellow River and may need to be continued or increased (U.S. Air Force, 2001d). In short, erosion along the Yellow River may be currently related to a variety of natural and man-made factors. Fluctuations in water level related to extreme rain events bring rapid increases in water height and flow, increasing the rate of erosion along riverbanks. The lack of shoreline vegetation at landing sites, which is typically removed when the landing is first constructed, destabilizes the riverbank. Despite these factors, use of Zodiacs, small rubber craft that carry 4 to 8 personnel, is relatively benign and would not result in any significant increase in shoreline small boat landings over what currently occurs as part of normal Eglin operations (approximately 1,500 per year at a number of landing sites throughout the reservation). Therefore, use of Zodiac boats would not create any significant impacts in terms of increasing erosion potentials along shorelines and rivers.

LCUs

LCUs would be strictly confined to waterways and shallow areas near shore, as LCUs are essentially ships and not “amphibious” in the classic sense of the word. Thus, no erosion impacts would occur from LCU use. No improvements would be needed to support LCU landings at the Hurlburt GOS or at Santa Rosa Island.

LCACs

Within the context of the Proposed Action, LCACs would only come into contact with the land surface at the shoreline while landing and during transit over Santa Rosa Island. The main impact driver associated with LCAC use is the need for site improvements at the landing sites to accommodate offloading of payloads. Use of these craft may require improvements at landing areas to accommodate them. Such improvements may involve vegetative clearing and surface hardening (i.e., building boat ramps or paved surfaces near the water’s edge for offloading). Analysis covers the shoreline from the mean high water line (potential impacts below the mean high water line are covered in the water quality section) to the upland areas and covers the need for improvements associated with landing and offloading.

The Hurlburt GOS would potentially experience up to 65 LCAC landings over 10 days (Figure A-32). No site improvements would be necessary to accommodate the LCACs, and because the site is already covered with gravel and pavement, no impacts to soils are anticipated at the site. The main areas of concern for LCAC use are Hammock Point (TA D-84), White Point, East Bay Point, Wynnhaven Beach, and Santa Rosa Island. Improvements would be necessary to allow offloading at Hammock Point (TA D-84), White Point, East Bay Point, and Wynnhaven Beach. Transit over Santa Rosa Island is also an issue that merits analysis. These are dealt with in the site narratives below.

Hammock Point (TA D-84)

Hammock Point, a rapidly eroding shoreline area, would entertain up to 10 LCAC landings during the 10-day period. Small boat raids would also occur at this site. However, no shoreline erosion impacts have been identified for use of Zodiac boats. LCACs would land just to the west of the dilapidated dock instead of using the boat ramp. This area is relatively flat at the shoreline and has a small sloping area that leads up to a paved area (see Photo B-5, Appendix B). This area would need some minor site improvements such as grading so that wheeled vehicles could be offloaded. Both craft would deliver troops and wheeled vehicles. Hammock Point would have to undergo some infrastructure improvements to accommodate offloading of wheeled vehicles.

Shoreline stabilization, the use of mesh down to the water line, and the use of gravel along the slope of any graded site would greatly reduce erosion potential at the site. During grading, best management practices (BMPs) must be employed, and coordination with AAC/EMSN and AAC/EMC during site improvements would ensure that the proper minimization procedures were adhered to. Additionally, state and/or federal permits may be required depending on the scope of the site improvement. Provided coordination is conducted, permits are acquired, and BMPs are employed for site improvements at Hammock Point to accommodate LCAC landings, no adverse impacts to soils and erosion at the site are anticipated. The site would be evaluated periodically to ensure that the erosion control measures are adequate.

Alaqua Point

Up to 10 LCAC landings and numerous small boat landings would occur at Alaqua Point during the 10-day period. Site improvements, including grading the shoreline and constructing concrete retaining walls and a boat ramp would potentially increase the erosion that is presently occurring along the shoreline of this site. BMPs would be implemented to control erosion.

White Point

White Point would experience up to five LCAC landings and any number of Zodiac boats. No shoreline erosion impacts have been identified with Zodiac boat use. The LCACs would only carry troops and wheeled vehicles to White Point. As with Hammock Point and Alaqua Point, site improvements would be necessary to accommodate the landing and offloading of LCACs. This would involve grading along the shoreline to allow the LCACs to reach sufficient land surface to offload their payload. However, shoreline stabilization, side stabilization for the ramped area, and BMPs would all be necessary at this site. Coordination with AAC/EMSN and AAC/EMC during these site improvements would ensure that the proper minimization procedures are adhered to. Additionally, state and/or federal permits may be required depending on the scope of the site improvement. Provided coordination is conducted, permits are acquired, and BMPs are employed for site improvements at White Point to accommodate LCAC landings, no adverse impacts to soils and erosion at the site are anticipated. The site would be evaluated periodically to ensure that the erosion control measures are adequate.

Wynnhaven Beach

Wynnhaven Beach would potentially experience 65 LCAC landings. LCACs would carry the full complement of MEU assets to Wynnhaven. In order to accommodate these craft, the site

would need improvements such as grading/slope modification, vegetation/tree clearing, and shoreline modification. Shoreline stabilization, side stabilization for the graded area, and BMPs would all be necessary at this site. Coordination with AAC/EMSN and AAC/EMC during these site improvements would ensure that the proper minimization procedures are adhered to. Additionally, state and/or federal permits may be required depending on the scope of the site improvement. Provided coordination is conducted, permits are acquired, and BMPs are employed for site improvements at Wynnhaven Beach to accommodate LCAC landings, no adverse impacts to soils and erosion at the site are anticipated. The site would be evaluated periodically to ensure that the erosion control measures are adequate.

East Bay Point

East Bay Point would accommodate up to four LCAC landings and any number of Zodiac boat landings. No shoreline erosion impacts have been identified with Zodiac boat use (Figure A-30). The LCACs would carry troops and wheeled vehicles only to East Bay Point. In order to accommodate these craft, the site would need improvements such as grading/slope modification, vegetation/tree clearing, and shoreline modification. BMPs would be required at this site (Figures B-1 through B-4). Coordination with AAC/EMSN and AAC/EMC during these site improvements would ensure that the proper minimization procedures are adhered to. Additionally, state and/or federal permits may be required depending on the scope of the site improvement. Provided coordination is conducted, permits are acquired, and BMPs are employed for site improvements at East Bay Point to accommodate LCAC landings, no adverse impacts to soils and erosion at the site are anticipated. The site would be evaluated periodically to ensure that the erosion control measures are adequate.

Santa Rosa Island

Santa Rosa Island (to include the Gulf and Sound side) would experience up to 134 LCAC landings over a 10-day period. While landings could occur anywhere along the shoreline from TA A-15 to TS A-11, LCAC landings are not anticipated to result in adverse impacts to soils, as these craft are essentially hovercraft. An LCAC dune crossing study conducted on Shoal Point, Panama City, Florida (SAIC, 1998), concluded that a maximum of 0.75 inches of sand was displaced after two consecutive passes of an LCAC within the same vicinity, with little to no impacts to dune vegetation. No improvements would be required to accommodate these landings. Erosion impacts at the land-water interface on Santa Rosa Island from LCAC landings are not anticipated.

AAVs

AAVs would only land at Wynnhaven Beach and Santa Rosa Island. Analysis covers the shoreline from the mean high water line to the upland area.

Wynnhaven Beach

Wynnhaven Beach would potentially experience 65 AAV landings over a 10-day period. AAVs would transit from Santa Rosa Island, across the Sound, and come ashore at Wynnhaven Beach. The greatest potential for impacts to the shoreline at Wynnhaven result from AAV landings and site improvements for LCAC landings. AAV landings have the potential to impact shoreline soil stability as tracks displace soils as they move over the ground surface.

Currently, the Wynnhaven Beach shoreline is relatively stable because it is a low-energy shoreline and because of the presence of vegetative cover and only a slight slope (Figures A-35, B-8 through B-10). However, use of track vehicles in this area would destroy vegetative cover and displace compacted soils along the shoreline. Also, removal of vegetation to accommodate LCAC landings at the site would make the shoreline more susceptible to erosion from AAV use. Increased erosion along the shoreline may carry sediments to adjacent properties, impacting shorelines along the Sound over the long term and temporarily increasing localized turbidity. Additionally, once begun, shoreline erosion would continue over the long term, with potentially extensive erosion occurring during large storm events. This would affect the utility of the site and may impact adjoining properties and transportation corridors.

Site improvements at Wynnhaven Beach would consider minimal vegetative cover removal and channeling AAV landings to either a single (recommended) or several shore-to-upland gravel landing sites with stabilized sides to prevent erosion. Gravel would prevent excessive runoff into the Sound from storm events and could be repaired after the MEU training activities (if required). Channeling AAV landings to a stabilized gravel landing site would minimize excessive erosion in the area. Accordingly, shoreline improvements at Wynnhaven would require coordination with AAC/EMSN and AAC/EMC, as well as all required state and federal permits. Monitoring would be conducted at the site to determine the full extent of impacts from AAV use and whether or not minimization procedures are adequate to prevent erosion.

Santa Rosa Island

Santa Rosa Island (to include the Gulf and Sound side) would experience up to 52 AAV landings and returns to the water on the Gulf side of the island between TA A-11 and TA A-15, 52 AAV landings and returns to the water on the Sound side of the island within a 1,500 foot area directly across the Sound from Wynnhaven Beach, 13 landings and returns to the water from the Gulf to the roadway at TS A-11A, and a number of lateral movements along the beach between TS A-11 and TA A-15 over a 10-day period. Potential impacts are associated with landings and returns to the water. AAVs displace large amounts of sand when moving at high rates of speed, essentially creating a spray of sand out from behind. No data were available regarding the actual amount of displacement from an individual AAV; however, as can be seen in Figure B-23, the amount may be substantial when considering the number of vehicles that would be operating on the island. As a result, post-mission monitoring will be conducted to determine the extent of sand displacement, and appropriate strategies to minimize impacts will be employed.

Shoreline erosion impacts associated with landing and returning to the water on the Gulf side are not anticipated, as the Gulf-side shoreline of the island is a high-energy environment with a constantly shifting profile. Of more concern is the Sound side of the island, which is typically protected from erosion by vegetation, is low energy, and has more silty sediments that are not as readily shifting as more sandy sediments. When landing and returning on the Sound side of the island, AAVs would transit through a designated corridor, avoiding vegetated areas in order to minimize shoreline erosion. Established splash points exhibiting minimal vegetation on the Sound side would be identified and adhered to. Additionally, shoreline stabilization actions such as planting of vegetation would be conducted around the edges of the splash points to minimize potential erosion.

4.5.1.2 Impacts from Ground Movement

Ground movement covers use of tracked vehicles, wheeled vehicles, and troop movements once offloaded from amphibious vehicles. This includes staging and transit and also addresses improvements to roads and bridges to accommodate ground movement to and from objective sites. Table 4-18 shows the relationship between ground movements and locations under the Proposed Action that may affect soils and erosion. Vehicle numbers are based on the following assumptions:

- Potential maximum usage of interstitial areas is 100 percent of MEU force.
- All vehicles would transit within mainland interstitial areas on established roads and trails. Off-road use of wheeled vehicles may occur near LZ/DZs, but only through coordination with AAC/EMSN.
- Only RR 259 and RR 253 would need road improvements to accommodate tank movement and large trucks, respectively. Only RR 259 would be used as a tank movement corridor between Wynnhaven Beach and TA B-75, and only the established tank trail leading from the Chicken Little site through TA C-52 to C-72 would be used on the eastern portion of the reservation. Tanks would be trucked to the Chicken Little location from staging areas. AAVs would only use clay-bed ancillary roads off RR 259 to reach other TAs for training activities.
- Only 4 M1A1 tanks would be utilized at TA B-75, TA C-52, and TA C-72.
- Digging of fighting positions and bivouacking would only occur on auxiliary fields for opposing forces. These sites would be coordinated with AAC/EMSN, AAC/EMR, AAC/EMH, and AAC/EMC.
- Wheeled vehicle and AAV use on test areas would be confined to established test area roads.

Table 4-18. Vehicle Use Associated with Ground Movement Activities

<table>
<tr><th rowspan="2">Location</th><th colspan="6">Vehicle</th><th rowspan="2">Troops</th><th rowspan="2">Improvements Needed</th></tr>
<tr><th>LCAC</th><th>Max # Potential</th><th>Tracked</th><th>Max # Potential</th><th>Wheeled</th><th>Max # Potential</th></tr>
<tr><td>Santa Rosa Island</td><td>✔</td><td>134 Crossings</td><td>✔</td><td>13 (58 crossings, lateral movement)</td><td rowspan="4">✔</td><td>5 LAVs
7 HMMWVs</td><td rowspan="4">Max of 200 at any one location</td><td rowspan="2">None</td></tr>
<tr><td>Other Interstitial</td><td colspan="2" rowspan="3">None</td><td colspan="2">None</td><td>15 LAVs
103 HMMWVs</td></tr>
<tr><td>Roads</td><td rowspan="2">✔</td><td>4 tanks
13 AAVs</td><td rowspan="2">15 LAVs
103 HMMWVs
35 7-ton trucks
6 M-198s
2 fuel trucks</td><td rowspan="2">Road improvements needed for tracked vehicles and large trucks</td></tr>
<tr><td>Test Areas</td><td>4 tanks (TAs B-75, C-52, C-72)
13 AAVs (Others)</td></tr>
</table>

Staging areas must be constructed at East Bay Point and at Wynnhaven Beach to accommodate offloading during amphibious landings. All other locations are cleared and have sufficient space to allow for staging of troops and vehicles. Construction of staging areas would involve vegetative clearing, site grading, and most likely laying of a gravel surface. At this point, no site design plans are available for East Bay Point or Wynnhaven Beach. Potential impacts to soils and erosion may result over the short-term during construction from removal of vegetative ground cover. BMPs such as silt fencing and use of certified weed-free hay bales would help to minimize potential impacts. Over the long-term, presence of a gravel surface layer would help to minimize runoff at the sites, thereby minimizing erosion during storm events. Additionally, vegetative cover around the periphery of the staging areas would also help to capture sediments during runoff events, minimizing potential sedimentation of nearby surface waters. Site improvements for staging areas would require coordination with AAC/EMSN and AAC/EMC once site design plans are available. Periodic monitoring would be conducted at the sites to determine whether or not minimization procedures are adequate to prevent erosion.

LCACs

Santa Rosa Island

Santa Rosa Island (to include the Gulf and Sound sides) would experience up to 134 LCAC landings over a 10-day period. While landings could occur anywhere along the shoreline from TA A-15 to TS A11, island crossings would only occur near TA A-13B (See Figures A-39 and B-16). No improvements would be required to accommodate these crossings. An LCAC dune crossing study conducted on Shoal Point, Panama City, Florida (SAIC, 1998), concluded that a maximum of 0.75 inches of sand was displaced after two consecutive passes of an LCAC within the same vicinity, with little to no impacts to dune vegetation. Because LCAC crossings would be limited to an “hourglass” shaped corridor, it can be reasonably assumed that sand would be displaced in the area over 10 days with 130 crossings. However, the barrier island is a dynamic environment, with constantly shifting sands and topography resulting from coastal breezes. Therefore, it is anticipated that the typical coastal breezes would eliminate most of the footprint caused by the LCAC flyover activity in a short period of time. Additionally, LCACs would not infringe on established dune areas, and the crossing area is relatively flat, with minimal dune vegetation. Erosion impacts on Santa Rosa Island from LCAC use are not anticipated.

Tracked Vehicles

Tracked vehicles include AAVs and M1A1 tanks. AAVs would utilize the interstitial areas of Santa Rosa Island, multiple test areas, and Eglin range roads. M1A1 tanks would only utilize Eglin Range Road 259 and established tank trails on the eastern portion of the reservation, TA B-75, and TA C-52.

Interstitial Areas

Interstitial areas refers to areas between test areas and test sites and established LZs, as well as staging areas. This includes the Eglin Mainland Reservation and Santa Rosa Island. All movement of tracked vehicles between test areas would take place on Eglin roadways, with the exception of AAV crossings and lateral movements on Santa Rosa Island. Full crossing on the island by AAVs would take place only at TS A-13B. This area is relatively flat and contains

minimal dune vegetation. While it is anticipated that a fair amount of sand would be displaced over the short term, only 13 AAVs would be crossing at any one time, and these would likely be spread out over the entire crossing area. This would help minimize potential impacts from channelized crossing. There would also be a number of days between crossing events, allowing winds to alleviate some of the sand displacement. It is very likely that more sand would be displaced by the numerous LCAC crossings than by the AAVs. AAVs would also cross from the Gulf to the road on Santa Rosa Island at TS A-11 during a Mechanized Raid Wet. Using 13 AAVs for this event, this equates to 26 crossings at the site. This would take place in a corridor approximately 300 meters on each side of TS A-11. In any event, whether at TS A-13B or A-11, no AAVs would cross over dunes or other beach vegetation, and AAVs would be directed to stay at least 50 feet from any dunes five feet or higher. Over the short term there would be sand displacement from AAVs utilizing the island. However, long-term impacts are not anticipated, as the dynamics of the barrier island would continue to shift sands across the face of the island and remove much of the footprint created by vehicle use. Impacts from lateral movement along the beach would be minimal provided AAVs maintain a minimum buffer of 50 feet from the primary dune line. Whenever possible, AAVs would only travel laterally below the mean high water line.

Roads

Movement of tracked vehicles (AAVs and M1A1 tanks) would take place between staging areas and objective sites. M1A1 tanks would move from the staging area at Wynnhaven Beach to Test Area B-75 along RR 259. Tanks would be trucked to the Chicken Little location from staging areas. AAVs would move along RR 259 and branch off to various test areas or auxiliary fields east of HWY 87 and west of HWY 85. There are only a few trails on Eglin that are designed, constructed, and routinely maintained to support designated tracked vehicle movements. The trail running from Chicken Little (C-52A) to TA C-72 is designated for tracked vehicle use and is used frequently for such purposes. Road improvements such as widening of the roadbed and clay bed formation would be required at a few points along RR 259 (Figure 2-1) between Wynnhaven Beach and TA B-75. M1A1 tanks and the larger wheeled vehicles require a 20-foot roadbed clearance for travel. Other roadways would need to be evaluated for the ability to support AAV transit between objective sites. Road improvements must adhere to the *Eglin Air Force Base Range Road Maintenance Handbook* (U.S. Air Force, 2001d) to minimize potential erosion impacts from road improvements and maintenance activities. Additionally, coordination with AAC/EMSN and AAC/EMCE, as well as acquisition of all appropriate state and federal permits is required for road improvements. Monitoring would be conducted at the sites to determine the full extent of impacts from tracked vehicle use and whether or not minimization procedures are adequate to prevent erosion. AAVs must utilize existing, unpaved clay-covered range roads for transit between objective sites. These transit corridors must be identified and evaluated post training activity to identify any potential impacts to roadways from tracked vehicle use. Any repairs or maintenance activities would be conducted in accordance with the *Eglin Air Force Base Range Road Maintenance Handbook.*

North of HWY 98 from Wynnhaven Beach, RR259 crosses the East Bay River. Currently, the bridge in place at this crossing would not support the weight of tracked vehicles (Figures A-40 and B-11). Over the long term, bridge fortification or replacement is being considered. Any bridge replacement or fortification would be evaluated under separate documentation once the

scope of the project has been identified. Short-term options, until bridge replacement/ fortification is completed, include trucking tracked vehicles from the staging areas to the objective sites or crossing the streambed. The former option is preferred over the latter. Without major improvements at the site, tracked vehicle use along the shoreline and through the streambed would destroy shoreline vegetation and expose the slopes to erosion from runoff, increasing sedimentation into the stream. The site is a natural area surrounded by wetlands with extensive tree cover up to the shoreline. The site improvements necessary to allow for short-term streambed crossing would be just as destructive to the site, and given that the long-term solution would be to accommodate the bridge, it would not be prudent to change the face and utility of the streambed and side slopes to allow for a year or two of stream crossings. Trees would have to be removed, and massive shoreline/slope stabilization actions would need to be taken to prevent erosion into the streambed. Given the current slope of the area, grading would need to be done to compensate. Overall, providing for stream crossings at this site is highly discouraged. However, should this option be chosen, coordination with AAC/EMSN and AAC/EMC would be necessary, and all appropriate state and federal permits would be required. Monitoring would be conducted at the site to determine the full extent of impacts from tracked vehicle use and whether or not minimization procedures are adequate to prevent erosion.

Test Areas

M1A1 tanks would operate only on TA B-75, which is a designated tank training area utilized by the Alabama Army National Guard for tank training activities; and along an established tank trail on the eastern portion of the reservation that runs through TA C-52, which is used by Chicken Little on a recurring basis; and at C-72 as a firing position. Tank training on TA B-75 was analyzed in the *Test Area B-75 Programmatic Environmental Assessment* (U.S. Air Force 2000d). While current tank training activities on TA B-75 do contribute to erosion at the site, overall, additional tank transit and maneuvering on TA B-75 from 4 M1A1 tanks over a 10-day period twice a year would not significantly contribute to current baseline tank training activities. Therefore, additional adverse impacts to soils and erosion on TA B-75, either independently or cumulatively, are not anticipated from M1A1 tank training activities. Tank use along the tank trails at TA C-52 and C-72 is an ongoing occurrence at Eglin AFB. The additional use of these sites by four tanks twice per year over a 10-day period is not anticipated to impact baseline conditions in an appreciable manner.

AAVs would potentially operate at any test area or auxiliary field east of HWY 87 and west of HWY 85. The only test area designated for tracked vehicle use is Test Area B-75, discussed previously. Of concern are the other test areas that could potentially be used for tracked vehicles (A-73, A-77, A-78, A-79, B-82, B-71, and B-12). The potential adverse impacts of land disturbance caused by tracked military vehicles on physical and biological resources are well documented (Severinghaus et al., 1979; Severinghaus and Severinghaus, 1982; Goran et al., 1983; Diersing et al., 1988; Johnson et al., 1990; Shaw and Diersing, 1990; Thurow et al., 1995; Trame and Harper, 1997). The degree of land degradation is partly dependent on the type, frequency, and duration of the land disturbance and the environmental conditions of the potentially impacted landscape platform that supports the mission activities.

Movement by tracked military vehicles on military installation training and testing areas generally occurs as overland passage or road travel. Overland passage refers to the random traverse of a land area or operation of the tracked vehicle on other than constructed and

maintained travel corridors. Road travel refers to trafficking that is confined to designated travel corridors such as roads that are designed, constructed, and routinely maintained to support designated tracked vehicle movements. None of the roads on these test areas have been designated for use by tracked vehicle training maneuvers and operations. Tracked vehicle maneuvers can be highly destructive to roadways if the corridors are not designed and constructed for that purpose. Consequently, travel corridors would be established and maintained on these test areas to support tracked vehicle use. The overland passage of tracked vehicles such as the AAV could disaggregate and compact soils, crush vegetation, expose soils to erosion, directly impact sensitive species such as the gopher tortoise and eastern indigo snakes, and destroy gopher tortoise burrows. As a result, movement of tracked vehicles on these test areas would be limited to identified travel corridors as mentioned previously. Coordination with AAC/CE and AAC/EMSN is required prior to tracked vehicle use on these test areas. Monitoring and evaluation of these test areas after tracked vehicle use would also be conducted to fully assess the adequacy of erosion minimization procedures.

Provided the minimization procedures described above are adhered to, no adverse impacts to soils and erosion from tracked vehicle use associated with MEU training activities are anticipated.

Wheeled Vehicles

Wheeled vehicles include HMMWVs, LAVs, 7-ton trucks, towed Howitzers, and flatbed trucks. All wheeled vehicles would be confined to existing roadways within interstitial areas of the Eglin Reservation (with the exception of Santa Rosa Island), areas immediately surrounding LZ/DZs, and test areas. Two range roads (RR 259 and RR 253) would need improvements to accommodate larger vehicles.

Interstitial Areas

Other than Santa Rosa Island, all wheeled vehicles would utilize existing roadways for movement corridors. On Santa Rosa Island, wheeled vehicles may be used as troop transport during raids or during crossing activities as perimeter guards. In either case, wheeled vehicles may move laterally along the beach face between TA A-15 and TS A-11 from below the mean high water line to within 50 feet of the primary dune line, across the island at the crossing corridor near Test Site A-13B, and from the shore to the road at the movement corridor at TA A-11A. Although large dunes provide good vantage points during training operations, wheeled vehicles on established dunes may destroy sensitive dune vegetation, which acts as a stabilizing, dune-building agent. Destruction of dune vegetation would have adverse impacts to the beach environment by destabilizing dunes and making them susceptible to wind and storm event erosion. Consequently, all wheeled vehicles would remain off dunes higher than five feet.

The majority of mainland transportation by interstitial users is on established range roads. Currently, off-road vehicle use, which is either vehicle use on non-numbered range roads or completely off of any road, is limited to organizations that must use transportation over rough terrain to meet mission requirements. Organizations use HMMWVs around LZs and DZs to set up support equipment. All other interstitial training groups are prohibited from off-road vehicle use as stated in mission test directives. The use of vehicles off-road is not permitted for the Army Rangers and other groups that utilize the Yellow River area (U.S. Air Force, 1997c).

Violation of the off-road restriction is grounds for suspension or even termination of the test directive. Off-road transportation associated with MEU training activities would be held to the same restrictions as current Eglin interstitial users. Specific LZ/DZs without wetland, Tier I, or significant botanical site constraints would be authorized for off-road support activities. Additionally, steephead slopes and seepage slopes would be restricted from off-road vehicle use around LZ/DZs. These areas are sensitive to loss of vegetation, which could result from wheeled vehicle use.

Unauthorized off-road use has been reported in sensitive areas along the Yellow River, such as significant botanical sites, Whitmier Island, and Hick's Creek Prairie (Chafin and Schotz, 1995; U.S. Air Force 1997c). This off-road vehicle use has been attributed to both military and recreational users and is potentially degrading the quality of these sensitive habitats. As with troop movement on foot, exact acreage of impact to sensitive habitats occurring from off-road vehicle use cannot be assessed without a monitoring program. Sensitive habitats, particularly wetlands, are potentially impacted by off-road vehicle use.

Roads

Movement of wheeled vehicles between test areas and objective sites would occur on established range roads. Range Roads 259 and 253 would need improvements to support large wheeled vehicles. Improvements to RR 259 were discussed previously. Improvements to RR 253 would be of the same preliminary scope; however, details are not available at this time. Improvements would involve widening of the roadbed, tree clearing, and laying of a clay road surface. As with road improvements on RR 259, improvements on RR 253 would be evaluated under separate environmental documentation once more detailed information regarding the scope of the improvements was available. Bridge improvements on RR 253 will be conducted in accordance with the terms and conditions of applicable permits. Such terms and conditions would involve actions to minimize impacts to the environment, such as use of silt screening and erosion BMP implementation during construction/improvements. Road improvements must adhere to the *Eglin Air Force Base Range Road Maintenance Handbook* (U.S. Air Force, 2001d) to minimize potential erosion impacts from road improvements and maintenance activities. Additionally, coordination with AAC/EMSN and AAC/EMCE, as well as acquisition of all applicable state and federal permits is required for road improvements. Monitoring would be conducted at the site to determine the full extent of impacts from tracked vehicle use and whether or not minimization procedures are adequate to prevent erosion.

Troops

Interstitial Areas

Ground troop movement through the interstitial areas of Eglin AFB has been evaluated within the *Interstitial Area Final Programmatic Environmental Assessment* (U.S. Air Force, 1999). Ground training operations in the interstitial area require troop movement on foot for navigation in terrestrial areas. In almost all cases, ground training on foot involves movement without leaving any evidence of troop presence. Land navigation training may occur during daytime or nighttime and usually involves the use of a compass, maps, and GPS (Global Positioning System). Troop movement on foot may also be used for training in search and rescue, personnel recovery, and reconnaissance. Personnel movement may occur on established roads, along or across streams, through cleared areas, wooded areas, and through swamp environments.

Currently, the area most intensely utilized for ground troop movements is around Camp Rudder (Auxiliary Field 6), along the Yellow River. The remaining areas along the Yellow River and an area south of TA B-70 are used to a lesser degree, as well as the AGOS training area #2 south of Duke Field. The rest of the interstitial area and Santa Rosa Island is used intermittently for troop movement on foot. For MEU training, a maximum total number of troops that could occur at any one location would be about 200.

Troops would potentially walk on Santa Rosa Island anywhere between TA A-11 and TA A-15. As discussed earlier, the dune habitat is sensitive to disturbance, and destruction of dune vegetation can adversely affect the dune environment, resulting in erosion of dunes and accelerated island dynamics. As a result, all troops would avoid walking on established dunes over five feet in height.

Of concern in mainland interstitial areas when evaluating potential impacts from troop movements is the crossing of streams and the potential for increased erosion due to loss of vegetative cover along stream banks. Troops crossing streams would avoid trampling stream bank vegetation and the creation of "crossing" ruts where loss of vegetation can start an erosion process along the stream bank. Troops must also avoid sensitive seepage slopes and steepheads, which are vulnerable to erosion, and erosion restoration sites. Exact locations of these sites for the purposes of display were unavailable. However, coordination with AAC/EMSN prior to MEU training activities would ensure that these areas are avoided. Digging of fighting positions and bivouacking would only occur on auxiliary fields for opposing forces.

Provided these minimization procedures are adhered to, troop movement within interstitial areas would not create any significant erosion problems.

Roads

No erosion impacts to road systems have been identified from troop movement.

Test Areas

Troop movements on test areas must avoid stream crossings and erosion control sites. Digging of fighting positions and bivouacking would only occur on auxiliary fields for opposing forces. Exact locations of these sites on the auxiliary fields are unavailable at this time. However, these sites would be coordinated with AAC/EMSN, AAC/EMR, AAC/EMH, and AAC/EMC. Provided these minimization procedures are adhered to, troop movement on test areas would not create any significant erosion problems.

4.5.1.3 Impacts from Aviation Operations

Erosion impacts would not occur from aviation operations.

4.5.1.4 Impacts from Munitions Use

Erosion impacts would not occur from munitions use.

4.5.1.5 Impacts from Pyrotechnics

Erosion impacts would not occur from pyrotechnics use.

4.5.2 Alternative 1: Minimal Infrastructure Improvements

Potential effects to soils from ARG/MEU training would be the same under this alternative. Erosion effects related to infrastructure improvements would decrease under this alternative since no road improvement and few site improvements would occur.

4.5.3 No Action Alternative

MEU training would not be conducted at Eglin Air Force Base. Therefore, no impacts would occur.

4.6 WETLANDS

Impacts to wetlands would potentially occur as a result of either destruction or degradation. Examples of wetland destruction would include construction within an existing wetland, while degradation could include any alteration of hydrology, water quality, vegetation, or soil profile from activities such as off-road vehicle use.

For the following analyses, the best information currently available on wetland locations was used. The main components of these wetlands impact analyses include the hydrology, water quality, and vegetative cover of the wetland in question, along with the type of MEU activity taking place in the area. The main elements of MEU training that could potentially impact wetlands are amphibious landings along the shoreline and ground movement of troops and vehicles across the island, mainland reservation, interstitial areas, and test areas. Wetlands are illustrated in Figures A-22 through A-28.

4.6.1 Proposed Action

4.6.1.1 Impacts from Amphibious Landing

Amphibious landings would require the construction of boat ramps or grading of the shoreline at some locations to accommodate some types of amphibious landing craft. There is potential for impacts from site improvements or amphibious landings to affect wetlands at Wynnhaven Beach, Hurlburt GOS, and East Bay Landing, but impacts can be minimized at some of these sites. The use of Zodiacs, which are small rubber boats that carry 4 to 8 personnel, is relatively benign and would not result in any significant increase in shoreline small boat landings over what currently occurs as part of normal Eglin operations (approximately 1,500 per year at a number of landing sites throughout the reservation). Therefore, use of Zodiac boats will not create any significant wetlands impacts since no site improvements would be necessary.

LCACs carrying troops and wheeled vehicles may land at Santa Rosa Island, Alaqua Point, Hammock Point (TA D-84), Hurlburt GOS, White Point, and East Bay Point. In order to accommodate these craft, all of these sites except SRI and the Hurlburt GOS would need improvements such as grading/slope modification, vegetation/tree clearing, and shoreline modification. Currently, no design or construction drawings for site improvements are available. However, shoreline stabilization, side stabilization for the graded area, and BMPs would be implemented at these sites to minimize secondary erosion impacts. Additionally, state and/or federal permits would be required depending on the scope of the site improvement.

Coordination with AAC/EMSN and AAC/EMC during these site improvements would ensure adherence to the proper impact minimization procedures.

To accommodate a large number of amphibious, tracked, and wheeled vehicles, the Wynnhaven Beach landing site would be cleared, except for a 50-foot buffer of trees around the perimeter of the site. At Wynnhaven Beach, 2.53 acres of wetland mixed forest and 1.14 acres of bay swamp would be impacted by site improvements, for a total of 3.67 acres of wetlands impacted. The clearing of wetlands for this landing site would require an Army Corps of Engineers Section 404 permit. Construction BMPs would be employed.

A total of 1.49 acres of palustrine wetlands at the Hurlburt landing site potentially could be impacted by amphibious landings, but they are relatively easy to avoid by remaining on paved areas and roads. If the LCACs land away from the central area of the footprint definition, there would be no impacts to the defined wetlands in that area. At the East Bay landing site, 1.00 acre of palustrine wetlands and 3.28 acres of estuarine wetlands (total 4.28 acres) may be impacted by site improvements required for LCACs to land at the site. These wetlands could not be easily avoided, and clearing of wetlands for this landing site would require an Army Corps of Engineers Section 404 permit. No impacts to wetlands from site improvements for amphibious landings are anticipated at Alaqua Point, Hammock Point (TA D-84), or White Point.

4.6.1.2 Impacts from Ground Movement

Ground movement includes the use of wheeled vehicles, tracked vehicles, and troop movements once offloaded from amphibious vehicles, along with the LCAC and AAV crossing at TA A-13B. This includes staging and transit and also addresses improvements to roads and bridges to accommodate ground movement to and from objective sites. Staging areas must be constructed at East Bay Point and at Wynnhaven Beach to accommodate offloading during amphibious landings, although no site design plans are available at this time. All other locations are cleared and have sufficient space to allow for staging of troops and vehicles. Construction of staging areas would involve vegetative clearing, site grading, and most likely laying of a gravel surface. Potential short term and long terms impacts to wetlands may result from the construction of staging areas. Site improvements for staging areas would require coordination with AAC/EMSN and AAC/EMC once site design plans are available. State and/or federal permits would be required depending on the extent and specific locations of site improvements.

LCACs

Santa Rosa Island

Minimal impacts to wetlands are anticipated from the crossing of LCACs over SRI. LCAC island crossings would occur only near Test Site A-13B (Figure A-25). No improvements would be required to accommodate these crossings. The crossover corridor at A-13B contains 7.10 acres of wet prairie and 0.81 acres of salt marsh, for a total of 7.91 acres of wetlands potentially impacted by LCAC crossings. The distribution of wetland areas at the crossover site makes complete avoidance difficult, but it would be possible to choose routes to minimize disturbance to wetlands. Even if wetlands are crossed over directly, due to the "hovercraft" nature of the LCAC, it is unlikely that wetlands would be impacted.

AAVs

Wetlands at the A-13B crossover point would be potentially impacted by AAVs even though avoidance measures would be taken. The crossover corridor at A-13B contains 7.10 acres of wet prairie, and 0.81 acres of salt marsh, for a total of 7.91 acres of wetlands impacted by crossover activities. The distribution of wetland areas at the crossover site makes complete avoidance difficult, but it would be possible to choose routes to minimize disturbance to wetlands. A permit may be required for potential impacts to wetlands. Permits usually contain specific terms, conditions, and mitigations that serve to minimize impacts. Analysis has not shown any significant impacts, and implementation of permit requirements will further ensure that there would be no significant impacts.

Troops

Interstitial Areas

For most interstitial areas on Eglin, it is unlikely that troops would be present in large enough numbers to impact wetlands. However, at A-11 on SRI, large numbers of troops would be moving through an area with 10.40 acres of wetlands during the Mechanized Raid Wet. The availability of roads at A-11 would minimize the amount of foot traffic within the wetlands. Interstitial areas refer to areas between test areas and test sites and established LZs, as well as staging areas. This includes the Eglin Mainland Reservation and Santa Rosa Island. Ground training operations in the interstitial area require troop movement on foot for navigation in terrestrial areas. Personnel movement may occur on established roads, along or across streams, and through cleared areas, wooded areas, and swamp environments. For MEU training, the maximum total number of troops that could occur at any one location would be approximately 200.

Troops would potentially walk on Santa Rosa Island anywhere between TA A-11 and TA A-15 (Figure 2-1). Wetlands are scattered throughout this area. Although intermittent foot traffic is unlikely to impact wetlands, large numbers of troops moving through wetlands could cause long-term impacts, thus these wetlands would be avoided whenever possible. During the Mechanized Raid Wet, vehicles would stop at the primary dune line at A-11, but troops would continue to move inland, where there is potential to impact 2.80 acres of freshwater marshes, 0.27 acres of inland shores/ephemeral ponds, and 7.33 acres of wet prairie, for a total of 10.40 acres of wetlands impacted by troop movements. Roads are present at A-11A that troops could use for movements, and since most of the wetlands are small, avoidance measures could be taken to minimize impacts to wetlands.

Potential impacts from troop movements in wetlands in mainland interstitial areas are also of concern. When possible, troops would avoid crossing through wetland areas. At times, when that is not possible, troops would avoid trampling wetland vegetation and the creation of “crossing” ruts that can alter hydrology. Digging will not be conducted in wetland areas, which will be identified through coordination with AAC/EMC prior to activity implementation. If there were any doubt as to whether an area is considered a wetland, troops would move to higher ground before digging. These minimization procedures will ensure that troop movement within interstitial areas will not cause any significant impacts to wetlands on Santa Rosa Island or mainland Eglin.

Roads

No impacts to wetlands are anticipated from troop movements on existing roads.

Test Areas

Troop movements on test areas will avoid wetlands. Digging of fighting positions and bivouacking would only occur on auxiliary fields for opposing forces. Exact locations of these sites on the auxiliary fields are unavailable at this time but, in general, upland areas represent suitable areas for digging while wetland areas would be unsuitable. Figure A-19 illustrates wetlands within the proposed ARG/MEU ground operations area, and digging would not be conducted in these areas. Other concerns, such as buried cultural resources and IRP sites, may further dictate which upland areas are acceptable for digging fighting positions, and these are discussed in the appropriate sections. In short, all digging will be coordinated with AAC/EMSN, AAC/EMR, AAC/EMH, and AAC/EMC. Provided these minimization procedures are adhered to, troop movements on test areas would not result in any significant impacts to wetlands.

Tracked Vehicles

Tracked vehicles include AAVs and M1A1 tanks. AAVs would utilize the interstitial areas of Santa Rosa Island, multiple test areas, and Eglin range roads. M1A1 tanks would only utilize Eglin Range Road 259, RR 668, RR 253, established tank trails on the eastern portion of the reservation, TA B-75, TA C-72, and TA C-52. For Mechanized Raid Wet events on SRI (Site A-11), AAVs would not travel through wetland areas but would stop at the primary dune and discharge troops to attack Site A-11A.

Interstitial Areas

All movement of tracked vehicles between test areas would take place on Eglin roadways, with the exception of AAV crossings and lateral movements on Santa Rosa Island. Full crossing on the island by AAVs would take place only at TS A-13B, with a maximum of 13 AAVs crossing at once (Figure A-25). Up to 7.91 acres of wetlands would be impacted by AAVs crossing at the A-13B crossover corridor. AAVs involved in a Mechanized Raid Wet on Santa Rosa Island at TS A-11 (Figure A-25) would stop at the mean high water line and would not impact any wetlands.

Wetlands at the A-13B crossover point would be potentially impacted by AAVs even though avoidance measures would be taken. The crossover corridor at A-13B contains 7.10 acres of wet prairie and 0.81 acres of salt marsh, for a total of 7.91 acres of wetlands impacted by AAVs. The distribution of wetland areas at the crossover site makes complete avoidance difficult, but it would be possible to choose routes to minimize disturbance to wetlands. If a vehicle operator is not sure whether an area is a wetland, then he would move to higher ground. Federal and state permits would be required for potential impacts to wetlands, specifically a FDEP Wetland Resource Management permit, and an Army Corps Dredge and Fill Permit. A Finding of No Practicable Alternative must also be prepared in accordance with Executive Order 11990.

Roads

Tracked vehicles would move between staging areas and objective sites on range roads. Road improvements needed for tracked vehicles would impact 1.41 acres of wetlands along RR 259, along with 20-foot by 20-foot areas for each culvert replaced on RR 666 and RR 668. M1A1 tanks would move from the staging area at Wynnhaven Beach to Test Area B-75 along RR 259, RR 253, and RR 668 (Figures 2-1 and A-19). Tanks would be trucked to the Chicken Little location from staging areas. AAVs would move along RR 259 and branch off to various test areas or auxiliary fields east of HWY 87 and west of HWY 85. There are only a few trails on Eglin that are designed, constructed, and routinely maintained to support designated tracked vehicle movements. The trail running from Chicken Little (C-52A) to TA C-72 (Figure 2-1) is designated for tracked vehicle use and is used frequently for such purposes. Road improvements such as widening of the roadbed, culvert replacement, and clay bed formation would be required along RR 259 to TA B-75 (Figure 2-1). M1A1 tanks and the larger wheeled vehicles require a 20-foot roadbed clearance for travel. Other roadways would need to be evaluated for their ability to support AAV transit between objective sites.

Road improvements must adhere to the *Eglin Air Force Base Range Road Maintenance Handbook* (U.S. Air Force, 2001d) to minimize potential erosion impacts from road improvements and maintenance activities. There are wetlands located along RR 259 that would be impacted by these proposed road improvements. Any such activities would require permits from the Army Corps of Engineers and the Florida Department of Environmental Protection. No wetlands south of the East Bay River Bridge on RR 259 would be impacted, but north of the bridge, 1.41 acres of palustrine and 0.004 acres of riverine wetlands (total 1.41 acres) would be impacted by road widening to 20 feet. Also, culvert replacements along RR 666 and RR 668 are assumed to each impact a 20 by 20 foot area of wetlands.

North of HWY 98 from Wynnhaven Beach, RR 259 crosses the East Bay River. Currently, the bridge in place at this crossing would not support the weight of tracked vehicles (Figure 2-1 and Figures B-11, B-12). Over the long-term, bridge fortification or replacement is being considered. No details are available at this time as to the scope of these activities. As a result, bridge replacement or fortification would be evaluated under separate documentation once the scope of the project has been identified. Any bridge improvements impacting wetlands would require permits from the Army Corps of Engineers, U.S. Coast Guard, and the Florida Department of Environmental Protection. A Finding of No Practicable Alternative (FONPA) must also be prepared in accordance with Executive Order 11990.

Test Areas

M1A1 tanks would operate only on TA B-75 along an established tank trail and on the eastern portion of the reservation that runs through TA C-52 and at C-72 as a firing position (Figure 2-1). The four-acre wetland located in the northeast section of TA B-75 would be a restricted area for tank maneuvering. If this area is avoided, impacts to wetlands on TA B-75 are not anticipated from M1A1 tank training activities. Tank use along the tank trails at TA C-52 and C-72 is an ongoing occurrence at Eglin AFB. The additional use of these sites by four tanks twice per year over a 10-day period is not anticipated to impact baseline conditions in an appreciable manner.

AAVs would potentially operate at any test area or auxiliary field east of HWY 87 and west of HWY 85. The only test area designated for tracked vehicle use is Test Area B-75, discussed previously. Of concern are the other test areas that could potentially be used for tracked vehicles (**A-**73, A-77, A-78, A79, B-82, B-71, and B-12) (Figure 2-1), and where on these test areas tracked vehicles would maneuver. None of the roads on these test areas have been designated for use by tracked vehicle training maneuvers and operations. Tracked vehicle maneuvers can be highly destructive to roadways if the corridors are not designed and constructed for that purpose, so movement of tracked vehicles on these test areas would be limited to identified travel corridors that can support tracked vehicle use. All wetland areas would need to be avoided. Coordination with AAC/EMCE and AAC/EMSN is required prior to tracked vehicle use on these test areas. If vehicles remain on existing roads, no impacts to wetlands are anticipated.

Wheeled Vehicles

Wheeled vehicles to be used during MEU training include HMMWVs, LAVs, 7-ton trucks, towed Howitzers, and flatbed trucks. All wheeled vehicles would be confined to existing roadways within interstitial areas of the Eglin Reservation (with the exception of Santa Rosa Island), areas immediately surrounding LZ/DZs, and test areas. Two range roads (RR 259 and RR 253) would require improvements to accommodate larger vehicles.

Interstitial Areas

Other than on Santa Rosa Island, all wheeled vehicles would utilize existing roadways for movement corridors. On Santa Rosa Island, wheeled vehicles may be used as troop transport during raids or during crossing activities as perimeter guards. In either case, wheeled vehicles may move across the island at the crossing corridor near Test Site A-13B and from the shore to the road at the movement corridor at TA A-11A (Figure A-39). Both of these areas have sensitive wetland habitats that would be avoided. If vehicles drive around wetlands, no impacts to wetlands are anticipated.

The majority of mainland transportation by interstitial users is on established range roads. Currently, off-road vehicle use, which is either vehicle use on non-numbered range roads or completely off of any road, is limited to organizations that must use transportation over rough terrain to meet mission requirements. Off-road transportation associated with MEU training activities would be held to the same restrictions as current Eglin interstitial users. Specific LZ/DZs without wetland, Tier I, or significant botanical site constraints may be authorized for off-road support activities, and cleared areas may be used to stage vehicles. Vehicles would remain on existing roads except in the above noted exceptions, and no impacts to wetlands are anticipated.

Roads

Movement of wheeled vehicles between test areas and objective sites would occur on established range roads. Range Roads 259 and 253 would require improvements to support large wheeled vehicles (Figure 2-1). Improvements to RR 259 were discussed previously under Tracked Vehicles. Improvements to RR 253 would be of the same preliminary scope; however, details are not available at this time. Improvements would involve widening of the roadbed, tree clearing, culvert replacement, laying of a clay road surface, and possible bridge

replacement/repair. As with road improvements on RR 259, improvements on RR 253 would be evaluated under separate environmental documentation once more detailed information regarding the scope of the improvements is available. Road improvements must adhere to the *Eglin Air Force Base Range Road Maintenance Handbook* (U.S. Air Force, 2001d) to minimize potential erosion impacts from road improvements and maintenance activities. Additionally, coordination with AAC/EMSN and AAC/EMCE, as well as acquisition of all appropriate state and federal permits, is required for road improvements and potential wetlands impacts.

Test Areas

As long as vehicles remain on existing roads, no adverse impacts to wetlands are anticipated from wheeled vehicles on test areas.

4.6.1.3 Impacts from Aviation Operations

Impacts to wetlands would not occur from Aviation Operations.

4.6.1.4 Impacts from Munitions Use

Munitions use (e.g., artillery, mortars) would not be allowed in wetlands. No impacts would occur.

4.6.1.5 Impacts from Pyrotechnics

Impacts to wetlands would not occur from pyrotechnics use.

4.6.2 Alternative 1: Minimal Infrastructure Improvements

Under this alternative, no infrastructure improvements would occur at RR 259; thus wetland areas would not be affected. Road widening would not occur at RR 253. Tracked vehicles would be trucked onto the Eglin Military Reservation using alternate routes. Wetland areas at Wynnhaven Beach, Alaqua Point, and East Bay Point would not be impacted since no clearing would occur and amphibious vehicles would not use the sites for offloading tracked and/or wheeled vehicles. These sites would still accommodate small boat landings. On Santa Rosa Island, wetland areas would be avoided as under the Proposed Action.

4.6.3 No Action Alternative

MEU training would not be conducted at Eglin Air Force Base. Therefore, no impacts would occur.

4.7 FLOODPLAINS AND COASTAL ZONE

Executive Order 11988, Floodplain Management, requires examination of actions involving construction (i.e., buildings, roads) within a floodplain for the potential to impact drainage patterns within the floodplain or for the potential for people or structures to be impacted by flooding in order to minimize or prevent loss of life and property. The beach landing areas at Alaqua Point, White Point, Hammock Point (TA D-84), East Bay Point, Wynnhaven Beach, and

Hurlburt Field are at least partially in the 100-year floodplain. The bridge crossings on the East Bay River at Range Roads 259 and 253 are also located in the 100-year floodplain. The beach landing and crossing area on Santa Rosa Island is located just outside of the 100-year floodplain. Across the rest of the Eglin Reservation, portions of various interstitial areas, roads, and test areas that would be used during operations also overlap with the 100-year floodplain, mainly in areas adjacent to streams, rivers, and bays.

The main components of these floodplain impact analyses include the potential changes in topography and current use of the floodplain in question, along with the type of MEU activity taking place in the area. The main elements of MEU training that could potentially impact floodplains are amphibious landings along the shoreline and ground movement of troops and vehicles across the mainland reservation, interstitial areas, and test areas. Permits from the USACE and/or FDEP may be required depending on the scope of site improvements.

4.7.1 Proposed Action

4.7.1.1 Impacts from Amphibious Landing

Zodiacs

Zodiac landings would occur in floodplain areas at multiple sites, including the Yellow River, Alaqua Point, East Bay Point, Hammock Point (TA D-84), and White Point (Figure 2-1). Zodiacs on the Yellow River would utilize existing boat ramps. At the other landing sites, the boats would land directly on the beach and would not require any site improvements. The use of Zodiacs is relatively benign and would not result in any significant increase in shoreline small boat landings over what currently occurs as part of normal Eglin operations. As a result, use of Zodiac boats will not create any significant adverse impacts to the floodplain.

LCUs

LCU landings at the Hurlburt GOS and Santa Rosa Island would not require site improvements. Thus, no change to the floodplain would occur.

LCACs

LCACs would only come into contact with the floodplain at the shoreline while landing. The potential impact associated with LCAC use is the requirement for site improvements at the landing sites to accommodate offloading of vehicles and equipment. Improvements may include vegetation clearing and surface hardening (i.e., building paved surfaces near the waterline for offloading). Analysis focuses on the need for improvements associated with landing and offloading of the LCAC at Alaqua Point, Hammock Point (TA D-84), White Point, East Bay Point, and Wynnhaven Beach.

Hammock Point (TA D-84)

Up to ten LCAC landings could occur during the 10-day period at Hammock Point (Figures 2-1 and A-23), with offloading of troops and wheeled vehicles. From the shoreline there is a small sloping area that leads up to a paved area (Figure B-7). This area would require some minor site improvements such as grading to allow the wheeled vehicles to offload. Hammock Point would

have to undergo some infrastructure improvements to accommodate offloading of wheeled vehicles. Slight modifications to the floodplain may occur from shoreline grading, but changes are not anticipated to be to the extent that any nearby structures would be at risk. A Joint Works in the Water Permit and a Section 404 Permit would be required for grading.

Alaqua Point

Up to ten LCAC landings could occur during the 10-day period at Alaqua Point, with offloading of troops and vehicles. Tracked vehicles would be loaded onto lowboy trucks and transported into the reservation. The landing area would require some minor site improvements such as grading. Slight modifications to the floodplain may occur from shoreline grading, but changes are not anticipated to be to the extent that any nearby structures would be at risk. A Joint Works in the Water Permit and a Section 404 Permit would be required for grading.

White Point

White Point (Figure A-26) would entertain up to five LCAC landings during the 10-day training period. Troops and wheeled vehicles only would be transported on the LCACs. The major required site improvement would be grading along the shoreline to allow the LCACs sufficient land surface to offload their payload. Shoreline stabilization, side stabilization for the ramped area, and BMPs would be conducted at this site. Slight modifications to the floodplain may occur from shoreline grading, but changes are not anticipated to be to the extent that any nearby structures would be at risk. A Joint Works in the Water Permit and a Section 404 Wetlands Permit would be required for grading.

East Bay Point

East Bay Point (Figure A-22) would experience up to four LCAC landings. The LCACs would carry troops and wheeled vehicles only to East Bay Point. In order to accommodate these craft, the site would require improvements such as grading/slope modification, vegetation/tree clearing, and shoreline modification. BMPs would all be implemented at this site. Slight modifications to the floodplain may occur from shoreline grading, but changes are not anticipated to be to the extent that any nearby structures would be at risk. A Joint Works in the Water Permit and a Section 404 Wetlands Permit would be required for grading.

Wynnhaven Beach

Wynnhaven Beach (Figure A-27) would potentially experience 65 LCAC landings. LCACs would carry the full complement of MEU assets to Wynnhaven. In order to accommodate these craft, the site would need improvements such as grading/slope modification, vegetation/tree clearing, and shoreline modification. Shoreline stabilization, side stabilization for the graded area, and BMPs would be conducted at this site. The potential for storm surge cut-through at Wynnhaven Beach may increase once vegetation is cleared. Maintenance of vegetative buffers along the sides of the area and along HWY 98, along with other stabilization measures listed above, would help to minimize this potential. A Joint Works in the Water Permit and a Section 404 Wetlands Permit would be required for grading.

Hurlburt Field

Hurlburt Field (Figures A-24) would potentially experience up to 65 LCAC landings over 10 days. No site improvements would be necessary to accommodate the LCACs, and because the site is already covered with gravel and pavement, no impacts to floodplains from LCAC landing/offloading are anticipated at the site.

AAVs

Wynnhaven Beach

Wynnhaven Beach (Figure A-27) would potentially experience 65 AAV landings over a 10-day period. AAVs would transit from Santa Rosa Island, across the Sound, and come ashore at Wynnhaven Beach. The greatest potential for impacts to the shoreline at Wynnhaven result from AAV landings and site improvements for LCAC landings. Currently, the Wynnhaven Beach shoreline is relatively stable because it is a low-energy shoreline and because of the presence of vegetative cover and only a slight slope (Figures B-8 through B-10).

Once vegetation is removed, there is increased potential for erosion, which could cause modifications to the Wynnhaven Beach floodplain and adjacent floodplain areas. Removal of vegetation to accommodate LCAC landings at the site would make the shoreline more susceptible to erosion from AAV use. AAV landings have the potential to modify floodplains through soil displacement and the destruction of vegetation as they move over the ground surface. Once begun, shoreline erosion would continue over the long term, with potentially extensive erosion occurring during large storm events. The potential for storm surge cut-through at Wynnhaven Beach may increase once vegetation is destroyed. Site improvements at Wynnhaven would consider minimal vegetative cover removal and channeling AAV landings to either a single (recommended) or several shore-to-upland gravel landing sites with stabilized sides to prevent erosion. Channeling AAV landings to a stabilized gravel landing site would minimize excessive erosion in the area. Shoreline improvements at Wynnhaven would require coordination with AAC/EMSN and AAC/EMC, as well as all required state and federal permits. Terms and conditions resulting from the permitting process would minimize potential adverse impacts.

4.7.1.2 Ground Movement

Ground movement includes the use of wheeled vehicles, tracked vehicles, and troop movements once offloaded from amphibious vehicles. This includes staging and transit and also addresses improvements to roads and bridges to accommodate ground movement to and from objective sites. Staging areas must be constructed at East Bay Point and at Wynnhaven Beach to accommodate offloading during amphibious landings. All other locations are cleared and have sufficient space to allow for staging of troops and vehicles. Construction of staging areas would involve vegetative clearing, site grading, and most likely laying of a gravel surface. Potential modifications to floodplains may result from the construction of staging areas. Site improvements for staging areas would require coordination with AAC/EMSN and AAC/EMC once site design plans are available.

Troops

Interstitial Areas

Troops in interstitial floodplain areas would be relatively dispersed and limited in number. Digging in interstitial areas might occur as fighting positions were constructed but these actions would not result in changes to the floodplain. Wet areas would be avoided since these areas are not desirable for fighting positions. Overall, no impacts to floodplains from troop movements in interstitial areas are anticipated.

Roads

No impacts to floodplains are anticipated from troop movements on existing roads.

Test Areas

Digging of fighting positions and bivouacking would only occur on auxiliary fields for opposing forces. Exact locations of these sites on the auxiliary fields are unavailable at this time, but generally dry ground is preferable for fighting positions and bivouac areas. Potential sites would be coordinated with AAC/EMSN, AAC/EMR, AAC/EMH, and AAC/EMC to minimize floodplain impacts. Provided these procedures are adhered to, troop movement on test areas would not create any significant impacts to floodplains.

Tracked Vehicles

Interstitial Areas

All movement of tracked vehicles between test areas would take place on Eglin roadways, with the exception of AAV crossings and lateral movements on Santa Rosa Island. Since the area proposed for MEU training on SRI is located outside of the 100-year floodplain, no impacts to floodplains are anticipated from interstitial activities by tracked vehicles.

Roads

Tracked vehicles would move between staging areas and objective sites on range roads. M1A1 tanks would move from the staging area at Wynnhaven Beach to Test Area B-75 along RR259 (Figures 2-1, A-40). Tanks would also be trucked to the Chicken Little location on Test Area C-52A from staging areas. AAVs would move along RR 259 and branch off to various test areas or auxiliary fields east of HWY 87 and west of HWY 85. There are only a few trails on Eglin that are designed, constructed, and routinely maintained to support designated tracked vehicle movements. The trail running from Chicken Little to TA C-72 is designated for tracked vehicle use and is used frequently for such purposes (Figure 2-1). Road improvements such as widening of the roadbed, culvert replacement, and clay bed formation would be required along RR 259 to TA B-75. M1A1 tanks and the larger wheeled vehicles require a 20-foot roadbed clearance for travel. Other roadways would need to be evaluated for the ability to support AAV transit between objective sites.

A Joint Works in the Water Permit, a Section 404 Wetlands Permit, a NPDES Permit, and a FONPA would be required for road/site improvements and activities at this site. Further

information on the site improvements (road widening and bridge work) proposed for RR 259 is detailed under the Wetlands section.

Test Areas

M1A1 tanks would operate only on TA B-75, TA C-52, and TA C-72 (Figure 2-1). AAVs would potentially operate at any test area or auxiliary field east of HWY 87 and west of HWY 85. Currently the only test areas designated for tracked vehicle use are TA B-75, TA C-52, and TA C-72, as discussed previously. Of concern are the other test areas that could potentially be used for tracked vehicles (A-73, A-77, A-78, A79, B-82, B-71, and B-12) (Figure 2-1) and where on these test areas tracked vehicles would maneuver. All floodplain areas would need to be avoided, and tracked vehicle maneuvers would need to be limited to identified travel corridors that can support tracked vehicle use, which are yet to be determined. Coordination with AAC/CE and AAC/EMSN is required prior to tracked vehicle use on these test areas. If floodplain areas are avoided, impacts are not anticipated from tracked vehicle training activities on test areas.

Wheeled Vehicles

Interstitial

Other than Santa Rosa Island and specific LZ/DZs without wetland, Tier I, or significant botanical site constraints (with proper authorization for off-road support activities), all wheeled vehicles would utilize existing roadways for movement corridors. Vehicles would not be driving through floodplain areas on the island, thus there are no potential floodplain impacts for the areas of Santa Rosa Island being used for MEU training. Because vehicles are restricted to existing roads on the mainland except in authorized situations, no impacts to floodplains are anticipated from wheeled vehicle traffic in interstitial areas.

Roads

Movement of wheeled vehicles between test areas and objective sites would occur on established range roads. Range Roads 259 and 253 (Figure A-40) would need improvements to support large wheeled vehicles, as discussed in the Wetlands Section. Potential impacts to floodplains are similar to those for wetlands, and are covered in the Wetlands Section. Modifications to the floodplain at the proposed bridge site would require a Finding of No Practicable Alternative.

Test Areas

As long as vehicles remain on existing roads, no adverse impacts to floodplains are anticipated from wheeled vehicles on test areas.

Coastal Zone Consistency Determination

With consideration of potential impacts to wetlands and floodplains, the Proposed Action is consistent with the Coastal Zone Management Program of the state of Florida. No changes to the floodplain would result, and impacts to wetlands would be minimized where possible through avoidance. Wetland fill permits would be obtained for those infrastructure projects that involve impacts to wetlands; all terms and condition of wetland fill permits would be followed.

As discussed in Chapter 3, the Florida Coastal Management Program (FCMP) is composed of 23 Florida statutes administered by 11 state agencies and four of the five water management districts. In Table 4-19 below consistency of the proposed action with the FCMP and the CZMA is identified.

Table 4-19. Proposed Action Consistency with Florida Coastal Management Program

FCMP Statute	FCMP Chapter Resource	Proposed Action Consistency Statement
Chapter 161	Coastal Construction	Construction permits, NPDES permits would be obtained.
Chapter 163	Local Government	Coordination with Local Governments will be accomplished.
Chapter 186	State and Regional Planning	The EA public review process would allow state and regional planners an opportunity to provide comments.
Chapter 252	Disaster Preparedness	Hurricane season would be avoided and no interference with disaster preparation would occur.
Chapter 253	State Lands	State lands would not be affected.
Chapter 258	Outdoor Recreation	Effects on outdoor recreation and tourism, addressed in the EA, would not be significant.
Chapter 259	Land Conservation Action of 1972	The status of conservation lands would not change.
Chapter 260	Recreational Trails System	The Florida Trail and Yellow River Canoe Trail are located within the Affected Environment but would not be significantly impacted.
Chapter 267	Historic Preservation	Cultural Resources potentially affected are identified in the EA and impacts will be mitigated as necessary.
Chapter 288	Commercial Development	Commercial development would not be affected since the action occurs on federal property.
Chapter 334 and 339	Public Transportation	Transportation, discussed in the EA, would not be significantly impacted.
Chapter 370 and 372	Living Resources	Living resources would not be significantly impacted.
Chapter 373	Water Resources	Water resources would not be significantly impacted. The necessary permits would be obtained.
Chapter 375	Outdoor Recreation, Land Acquisition	Impacts to outdoor recreation, discussed as a Restricted Access issues in the EA, would not be significant. No land would be acquired.
Chapter 376	Pollutant Spill Prevention	Pollutant spill personnel and procedures would be in place to handle any such occurrence.
Chapter 377	Oil and Gas Production	Oil and gas would not be affected.
Chapter 380	Land and Water Management	No changes to Land and Water Management would result.
Chapter 381	Public Health	Public health issues of noise and safety, addressed in the EA, would not result in significant impacts.
Chapter 388	Mosquito Control	Mosquito control is not applicable to the Proposed Action.
Chapter 403	Sources of Water and Air	Water and air quality impacts would not be significant. Potable water sources would not be affected.
Chapter 582	Soil and Water Conservation	Soil and water conservation issues are addressed as Best Management Practices for construction activities and adherence to existing Eglin policies regarding the disposal of wastewater.

4.7.1.3 Impacts from Aviation Operations

Aviation Operations would have no effect on floodplains.

4.7.1.4 Impacts from Munitions Use

Live munitions and ordnance would not be used within floodplain or wetland areas.

4.7.1.5 Impacts from Pyrotechnics

Smoke grenades and flares may be used within floodplain areas, but no impact is anticipated from this action, which occurs regularly throughout the Eglin Military Complex.

4.7.2 Alternative 1: Minimal Infrastructure Improvements

Under this alternative, there would be no site improvements at Wynnhaven Beach, Alaqua Point, White Point, Hammock Point, or East Bay Point, and therefore no modifications to the floodplain. Infrastructure improvements at Santa Rosa Island would have minimal or no effect on floodplain topography and would not affect structures within the floodplain. This alternative would have no significant impacts on floodplains or the coastal zone.

4.7.3 No Action Alternative

MEU training would not be conducted at Eglin Air Force Base. Therefore, no impacts would occur.

4.8 WATER QUALITY

Water quality is a measurement of the chemical and physical characteristics of a water mass that describes its suitability for specific uses. The surface water quality of rivers, streams, creeks, bayous, and bays in the range of influence is rated periodically by the state. In general, FDEP rated all the major river/stream mainstems (Yellow River, Turkey Creek, Rocky Creek, Turtle Creek, and Live Oak Creek) as fully meeting water quality standards (FDEP, 2002). Current water quality for Eglin streams and bays is good, but excess sedimentation is a problem for many water bodies on and around Eglin.

Analyses focus on potential changes to water quality parameters at the various sites where MEU training operations are to take place. The major concern for most of the proposed MEU training operations is potential changes in turbidity from erosion. There may also be changes in dissolved oxygen from the disturbance of bottom sediments. No changes to pH or nutrient levels are anticipated and thus will not be analyzed. As with all watercraft, some minimal residual petroleum products may be released from boats and amphibious craft, but the amount would not be significant. The main elements of MEU training that could potentially impact water quality are amphibious landings along the shoreline and ground movement of troops and vehicles across the island, mainland reservation, interstitial areas, and test areas. Wetland water quality issues are covered under the Wetlands Section, bilge releases are discussed under the Hazardous Materials Section, and erosion control issues are discussed under the Soils Section.

4.8.1 Proposed Action

4.8.1.1 Impacts from Amphibious Landing

Amphibious landings involve the use of LCACs, LCUs, AAVs, and Zodiac boats at the land-water interface.

Zodiacs

Zodiac landings would occur at multiple sites, including the Yellow River, Alaqua Point, East Bay Point, Hammock Point (TA D-84), White Point, and Santa Rosa Island (Figure A-5). Zodiacs on the Yellow River would utilize existing boat ramps. At the other landing sites, the boats would land directly on the beach and would not require any site improvements. The use of Zodiacs is relatively benign and would not result in any significant increase in shoreline small boat landings over what currently occurs as part of existing Eglin operations or recreational use of these areas. Small boat operations would temporarily affect turbidity at the landing site, but would have no lasting or significant effects due to quick dispersal of materials in the water column. Zodiacs would travel through the southernmost part of the Yellow River, which is part of the Yellow River Marsh Aquatic Preserve, an area designated as an Outstanding Florida Water (OFW). Small boat use, either from military or public recreation, is an ongoing activity in the Yellow River Marsh Aquatic Preserve that has minimal impact on water quality.

LCUs

LCUs are essentially ships and not “amphibious” in the classic sense of the word. These craft would land at the Hurlburt GOS and Santa Rosa Island. No site improvements would be needed to support LCU landings at either location.

Hurlburt

The Hurlburt GOS (Figure 2-1) would potentially be used for up to 21 LCU landings over the 10-day period. No changes to water quality are anticipated from LCU landings, which would not be different in nature from other uses of the GOS; barge offloading is a frequently occurring activity at this location. The channel at Hurlburt is of sufficient depth that the LCU would not drag on the bottom and would have no impacts on water quality.

Santa Rosa Island

LCU landings may also occur offshore from Santa Rosa Island (Figure 2-1). The LCU has a 7-foot draft and would be required to stop offshore when waters became too shallow. It is likely to hit bottom sediments and cause increases in turbidity. Offloading of vehicles from the LCU and their movement to the shore would also increase water column turbidity. Wave action and resulting turbidity far outweigh the short-term, localized increases in turbidity that would result from LCU landings and offloading. Minimal, short-term water quality impacts are anticipated from LCU landings at Santa Rosa Island, but would return to normal within a day.

LCACs

The main impact driver associated with LCAC use is the need for site improvements at the landing sites to accommodate offloading of payloads. Use of these craft may require improvements at landing areas to accommodate them. Such improvements may involve vegetative clearing and surface hardening (i.e., building boat ramps or paved surfaces near the water's edge for offloading). Analysis covers the potential impacts below the mean high water line (impacts from the mean high water line to the upland areas are covered in the Soils Section), and covers the need for improvements associated with landing and offloading. The major potential water quality issue for LCACs is the potential runoff and turbidity from site improvement construction.

The main areas of concern for LCAC use are Hammock Point (TA D-84) and Alaqua Point, White Point, East Bay Point, Wynnhaven Beach, and Santa Rosa Island. Improvements would be necessary to allow offloading at TA D-84, White Point, and Wynnhaven Beach. These are discussed in the site narratives below.

Hammock Point (TA D-84)

Hammock Point (Figures 2-1, B-5 – B7), a rapidly eroding shoreline area, would experience up to 10 LCAC landings during the 10-day period. If only LCACs are used at the site (as opposed to LCUs and LCACs), the LCAC would land just to the west of the dilapidated dock instead of using the boat ramp. This area is relatively flat at the shoreline and has a small sloping area that leads up to a paved area (Figure A-23, B-7). This area would require some minor site improvements such as grading so that wheeled vehicles could be offloaded. The LCAC would deliver troops and wheeled vehicles. TA D-84 would have to undergo some infrastructure improvements to accommodate offloading of wheeled vehicles.

Currently, no design or construction drawings for site improvements are available for TA D-84. Shoreline stabilization, the use of mesh down to the water line, and the use of gravel along the slope of any graded site would greatly reduce erosion potential and resulting turbidity at the site. During site improvement activities, erosion control best management practices (BMPs) as stipulated in the site design plan must be employed. Coordination with AAC/EMSN and AAC/EMC during site improvements would ensure adherence to proper impact minimization procedures. Provided coordination is conducted and BMPs are employed for site improvements at Hammock Point to accommodate LCAC landings, no adverse water quality impacts at the site are anticipated.

Alaqua Point

Activities at Alaqua Point would be the same as those at Hammock Point. LCACs would offload troops and tracked and wheeled vehicles. The beach area would require grading and stabilization and if needed, a retaining wall would be constructed. An older retaining wall is now located offshore and would be removed. Alaqua Point would support up to 10 LCAC landings during the 10-day period. This area would require some minor site improvements such as grading. During site improvement activities, erosion control BMPs as stipulated in the site design plan must be employed. Coordination with AAC/EMSN and AAC/EMC during site improvements

would ensure adherence to proper impact minimization procedures. No adverse water quality impacts at the site are anticipated.

White Point

White Point (Figure A-26) would experience up to five LCAC landings. As with TA D-84, site improvements would be necessary to accommodate the landing and offloading of LCACs. This would involve grading along the shoreline to allow the LCACs to reach sufficient land surface to offload their payload. Shoreline stabilization, side stabilization for the ramped area, and erosion control BMPs would all be necessary at this site. During site improvement activities, erosion control BMPs as stipulated in the site design plan must be employed. Coordination with AAC/EMSN and AAC/EMC during site improvements would ensure adherence to proper impact minimization procedures. Provided coordination is conducted and BMPs are employed for site improvements at White Point to accommodate LCAC landings, no adverse impacts to water quality at the site are anticipated.

Santa Rosa Island

Santa Rosa Island (to include the Gulf and Sound side) would experience up to 134 LCAC landings over a 10-day period. No site improvements would be required to accommodate these landings. While landings could occur anywhere along the shoreline from TA A-15 to TS A-11, LCAC landings are not anticipated to result in adverse impacts to water quality, as these craft are essentially hovercraft.

East Bay Point

East Bay Point (Figures A-22, B-1 – B-4) would experience up to four LCAC landings. In order to accommodate these craft, the site would require improvements such as grading/slope modification, vegetation/tree clearing, and shoreline modification. Erosion control BMPs would be implemented at this site. Coordination with AAC/EMSN and AAC/EMC during these site improvements would ensure that the proper minimization procedures are adhered to. Additionally, state and/or federal permits may be required depending on the scope of the site improvement. If site improvements exceed one acre, then a NPDES permit would be required. Provided coordination is conducted, permits are acquired, and erosion control BMPs are employed for site improvements at East Bay Point to accommodate LCAC landings, no adverse impacts to water quality at the site are anticipated.

Wynnhaven Beach

Wynnhaven Beach (Figure A-27, B-8 – B-10) would potentially experience 65 LCAC landings. In order to accommodate these craft, the site would require improvements such as grading/slope modification, vegetation/tree clearing, and shoreline modification. Shoreline stabilization, side stabilization for the graded area, and erosion control BMPs would be conducted at this site. Coordination with AAC/EMSN and AAC/EMC during these site improvements would ensure that the proper minimization procedures are adhered to. Additionally, state and/or federal permits may be required depending on the scope of the site improvement. The gravel area that would be created at Wynnhaven Point would be greater than one acre; thus, a stormwater construction permit (NPDES) would be required. Provided coordination is conducted, permits are acquired, and erosion control BMPs are employed for site improvements at Wynnhaven

Beach to accommodate LCAC landings, no adverse impacts to water quality at the site are anticipated.

Hurlburt

Hurlburt Field (Figure A-24, B-13) would potentially experience up to 65 LCAC landings over 10 days. No site improvements would be necessary to accommodate the LCACs, and no change to water quality would occur as a result of LCAC landings at the site.

AAVs

AAVs would only land at Wynnhaven Beach and Santa Rosa Island. Analysis covers impacts below the mean high water line; the Soils Section covers from the mean high water line to the upland area.

Santa Rosa Island

Santa Rosa Island (Figure A-25) would experience up to 52 AAV landings and returns to the water on the Gulf side of the island between TA A-11 and TA A-15, 52 AAV landings and returns to the water on the Sound side of the island within a 1,500 foot area directly across the Sound from Wynnhaven Beach, 13 landings and returns to the water from the Gulf to the roadway at TS A-11A (Figure B-14), and a number of lateral movements along the beach between TS A-11 and TA A-15 over a 10-day period. Potential impacts are associated with landings and returns to the water. AAVs would displace large amounts of sand when moving at high rates of speed on the beach and would churn up bottom sediments upon landings and returns. No data were available regarding the actual amount of displacement from an individual AAV; however, the amount may be substantial when considering the number of vehicles that would be operating on the island. Postmission monitoring would be conducted to assess changes caused by AAV activities.

Shoreline turbidity associated with landing and returning to the water on the Gulf side is not anticipated, as the Gulf-side shoreline of the island is a high-energy environment with a constantly shifting profile. Of more concern is the Sound side of the island, which is typically protected from erosion by vegetation, is low energy, and has more silty sediments that are not as readily shifting as more sandy sediments. Measures to reduce potential shoreline erosion are covered under the Soils Section. Disturbance of bottom sediments on the Sound side of the island, with associated changes in turbidity and dissolved oxygen, would be temporary and localized, and levels would be anticipated to return to normal within a day.

Wynnhaven Beach

Wynnhaven Beach (Figure A-27) would potentially experience 65 AAV landings over a 10-day period. AAVs would transit from Santa Rosa Island, across the Sound, and come ashore at Wynnhaven Beach. AAV landings have the potential to impact shoreline water quality out to a distance where the AAV tracks touch bottom (4 foot depth), where they begin to displace soils as they move over the bottom surface. Short-term increases in turbidity would be expected, but would settle within a day. There would also likely be some effect on dissolved oxygen when the bottom sediments are stirred up, but natural storm events can produce the same effects and on a

wider scale. Minimal, short-term water quality impacts are anticipated from AAV landings at Wynnhaven Beach, but water quality would return to normal within a day.

Currently, the Wynnhaven Beach shoreline is relatively stable because it is a low-energy shoreline and because of the presence of vegetative cover and only a slight slope. As discussed in the Soils Section, use of tracked vehicles in this area would destroy vegetative cover and displace compacted soils along the shoreline, leading to increased erosion and turbidity in the water. Additionally, once begun, shoreline erosion would likely continue over the long term, with potentially extensive erosion occurring during large storm events.

Multiple suggestions are made under the Soils Section for ways to minimize runoff into the Sound from site improvements, including minimal vegetative cover removal and channeling AAV landings to either a single (recommended) or several shore-to-upland gravel landing sites with stabilized sides. Accordingly, shoreline improvements at Wynnhaven would require coordination with AAC/EMSN and AAC/EMC, as well as all required state and federal permits. As detailed in the LCAC section, an NPDES permit would be required on site improvements at Wynnhaven Beach. Provided coordination was conducted, permits were acquired, and erosion control BMPs were employed for site improvements at Wynnhaven Beach to accommodate AAV landings, no adverse impacts to water quality from site improvements would be anticipated.

Ballast and Bilge Water Releases

ARG ships and amphibious craft such as AAVs and LCUs frequently release ballast and bilge water. Ballast water is essentially seawater that has been drawn into the hull of the vessel to control buoyancy and may be released at any point during ARG/MEU operations. By law, vessels of the armed forces are prohibited from releasing untreated bilge water within 12 nautical miles of shore. ARG/MEU vessels would comprise a small percentage of currently operating watercraft (i.e., commercial and recreational ships and boats) in the Gulf of Mexico and nearshore areas. Ballast and bilge releases that occur beyond 12 nautical miles from shore would be comparatively small, and no significant impacts would occur from these releases.

4.8.1.2 Impacts from Ground Movement

Ground movement includes the use of wheeled vehicles, tracked vehicles, and troop movements once offloaded from amphibious vehicles, along with the LCAC crossing at TA A-13B. This includes staging and transit and also addresses improvements to roads and bridges to accommodate ground movement to and from objective sites. Staging areas would have to be constructed at East Bay Point and at Wynnhaven Beach to accommodate offloading during amphibious landings. All other locations are cleared and have sufficient space to allow for staging of troops and vehicles. Construction of staging areas would involve vegetative clearing, site grading, and most likely laying of a gravel surface. Potential short-term and long-term impacts to water quality might result from the construction of staging areas. Site improvements for staging areas would require coordination with AAC/EMSN and AAC/EMC once site design plans were available. State and/or federal permits may also be required depending on the extent and specific locations of site improvements.

LCACs

Santa Rosa Island

The only waters potentially impacted by the LCAC island crossings at TA A-13B (Figure A-25) are wetlands. As stated in the Wetlands Section, even if wetlands are crossed over directly, due to the “hovercraft” nature of the LCAC, it is unlikely that water quality would be impacted.

Troops

Troop movement and bivouac would potentially generate wastewater. Eglin AFB requires that some types of graywater wastes generated on the land ranges or on Santa Rosa Island be disposed of properly. Graywater is shower and sink wash water produced from field operations. Existing Eglin AFB procedures for handling sewage and kitchen wastes would eliminate any potential effects on ground and surface waters. Wastewater from field kitchens would be contained and transported to on-base or off-base wastewater plants, but collection of field shower water is not required since no water quality issues are associated with this type of graywater. Portable latrines will be provided at several locations. Coordination with the 96 Civil Engineering Group at Eglin AFB would ensure that these requirements are met.

Interstitial

Interstitial areas refer to areas between test areas and test sites and established LZs, as well as staging areas. For MEU training, the maximum total number of troops that could occur at any one location would be approximately 200. Dispersed troop movements through water bodies are not anticipated to impact water quality. Large troop movements would cross water bodies via established roads when possible. At times when that is not possible, troops would avoid trampling riparian vegetation. Vegetation stabilizes sediments, and extreme losses of riparian vegetation will lead to shoreline erosion, increased sedimentation, changes to the streambed, and shallower water depths. From brief occasional troop crossings, short-term increases in turbidity at crossing sites may result, but would quickly settle back to normal conditions. Digging would be avoided near water bodies. Provided these minimization procedures are adhered to, troop movement within interstitial areas is not anticipated to impact water quality on Santa Rosa Island or mainland Eglin.

Roads

No impacts to water quality are anticipated from troop movements on existing roads.

Test Areas

Dispersed troop movements through water bodies are not anticipated to impact water quality. Large troop movements on test areas would use existing roads to cross water bodies when possible. At times when that is not possible, troops would avoid trampling riparian vegetation. Short-term increases in turbidity at crossing sites may result but would quickly settle back to normal conditions. Digging of fighting positions and bivouacking would only occur on auxiliary fields for opposing forces. Acceptable digging sites would be coordinated with AAC/EMSN, AAC/EMR, AAC/EMH, and AAC/EMC to avoid areas near water bodies. Provided these

minimization procedures are adhered to, troop movement on test areas is not anticipated to impact water quality.

Tracked Vehicles

Tracked vehicles include AAVs and M1A1 tanks. AAVs would utilize the interstitial areas of Santa Rosa Island, multiple test areas, and Eglin range roads. M1A1 tanks would only utilize Eglin Range Road 259, established tank trails on the eastern portion of the reservation, TA B-75, TA C-72, and TA C-52.

Interstitial

All movement of tracked vehicles between test areas would take place on Eglin roadways, with the exception of AAV crossings and lateral movements on Santa Rosa Island. Full crossing on the island by AAVs would take place only at TS A-13B, with a maximum of 13 AAVs crossing at once (Figure A-25). Wetlands are the only water bodies present in this area, and measures to protect them are covered under the Wetlands Section. AAVs would also cross from the Gulf to the road on Santa Rosa Island at TS A-11 (Figure A-25) during a Mechanized Raid Wet. This would take place in a corridor approximately 300 meters on each side of TS A-11. Wetlands in this corridor would be avoided whenever possible and significant impacts to water quality are not anticipated.

Roads

Tracked vehicles would move between staging areas and objective sites on range roads. M1A1 tanks would move from the staging area at Wynnhaven Beach to Test Area B-75 along RR 259 (Figure A-40). Tanks would be trucked to the Chicken Little location from staging areas. AAVs would move along RR 259 and branch off to various test areas or auxiliary fields east of HWY 87 and west of HWY 85. There are only a few trails on Eglin that are designed, constructed, and routinely maintained to support designated tracked vehicle movements. The trail running from Chicken Little (C-52A) to TA C-72 (Figure 2-1) is designated for tracked vehicle use and is used frequently for such purposes. Road improvements such as widening of the roadbed, culvert replacement, and clay bed formation would be required along RR 259 to TA B-75 (Figure 2-1). M1A1 tanks and the larger wheeled vehicles require a 20-foot roadbed clearance for travel. Other roadways would need to be evaluated for their ability to support AAV transit between objective sites.

Road improvements would adhere to the *Eglin Air Force Base Range Road Maintenance Handbook* (U.S. Air Force, 2001d) to minimize potential erosion impacts from road improvements and maintenance activities. There are water bodies located along RR 259 (Figure A-40) that could potentially be impacted by these proposed road improvements, including wetlands, which are covered under the Wetlands Section. The major water quality impact would be potential increases in turbidity. During construction activities, BMPs such as sediment curtains in the water and erosion control measures along the shoreline would be implemented to minimize the extent of sedimentation and turbidity.

North of HWY 98 from Wynnhaven Beach, RR 259 crosses the East Bay River (Figure A-40). Currently, the bridge in place at this crossing would not support the weight of tracked vehicles

(Figures B-11, B12). Over the long-term, bridge fortification or replacement is being considered. No details are available at this time as to the scope of these activities. As a result, bridge replacement or fortification would be evaluated under separate documentation once the scope of the project has been identified, and may require permitting actions. During construction activities, BMPs such as sediment curtains in the water and erosion control measures along the shoreline would be needed to minimize the extent of sedimentation and turbidity. Bridge improvements would likely exceed one acre in scope and would thus require an NPDES permit in addition to other permits required for wetland and floodplain impacts.

Short-term options until bridge replacement/fortification is completed include trucking tracked vehicles from the staging areas to the objective sites or driving through the riverbed. The former option is preferred over the latter. The site is a natural area surrounded by wetlands with extensive tree cover up to the shoreline. The shoreline site improvements necessary to allow for short-term riverbed crossing would be just as destructive to the site as the river crossing itself. Even with major improvements at the site, tracked vehicle use along the shoreline and through the streambed would likely destroy shoreline vegetation and increase sedimentation and turbidity. Erosion and changes in turbidity at this site would continue until the bank reached a new equilibrium, which could take years. BMPs such as sediment curtains in the water and erosion control measures along the shoreline would be needed to minimize the extent of sedimentation and turbidity.

Given that the long-term solution would be to accommodate the bridge, it would not be prudent to alter the character of the streambed and side slopes to allow for a year or two of stream crossings. Trees would have to be removed, and shoreline/slope stabilization actions would need to be taken to prevent erosion into the river. Overall, providing for stream crossings at this site is highly discouraged. However, should this option be chosen, coordination with AAC/EMSN and AAC/EMC would be necessary.

Test Areas

M1A1 tanks would operate only on TA B-75 along an established tank trail on the eastern portion of the reservation that runs through TA C-52 and at C-72 as a firing position (Figure A-20). AAVs would potentially operate at any test area or auxiliary field east of HWY 87 and west of HWY 85. The only test area designated for tracked vehicle use is Test Area B-75, discussed previously. Of concern are the other test areas that could potentially be used for tracked vehicles (A-73, A-77, A-78, A79, B-82, B-71, and B-12) (Figure A-20) and where on these test areas tracked vehicles would maneuver. Tracked vehicles would limit stream crossing to established roads and low water crossings, and wetlands would be avoided. If vehicles remain on existing roads and tank trails, impacts to water quality are not anticipated from tracked vehicle use on Test Areas.

Wheeled Vehicles

Wheeled vehicles to be used during MEU training include HMMWVs, LAVs, 7-ton trucks, towed Howitzers, and flatbed trucks. All wheeled vehicles would be confined to existing roadways within interstitial areas of the Eglin Reservation (with the exception of Santa Rosa Island), areas immediately surrounding LZ/DZs, and test areas. Two range roads (RR 259 and RR 253) would require improvements to accommodate larger vehicles.

Interstitial

Other than on Santa Rosa Island, all wheeled vehicles would utilize existing roadways for movement corridors. On Santa Rosa Island, wheeled vehicles may be used as troop transport during raids or during crossing activities as perimeter guards. In either case, wheeled vehicles may move across the island at the crossing corridor near Test Site A-13B and from the shore to the road at the movement corridor at TA A-11A (Figure A-25). As discussed in the Wetlands section, impacts to wetlands water quality are not anticipated if vehicles drive around wetlands.

The majority of mainland transportation by interstitial users is on established range roads. As detailed previously, off-road vehicle use is limited to organizations that must use transportation over rough terrain to meet mission requirements. Vehicles would not drive through streams, ponds, or wetlands. If vehicles remain on existing roads (except in noted exceptions), impacts to water quality are not anticipated from wheeled vehicle traffic in interstitial areas.

Roads

Movement of wheeled vehicles between test areas and objective sites would occur on established range roads. Range Roads 259 and 253 would require improvements to support large wheeled vehicles (Figure A-40). Both RR259 and RR253 cross water bodies, and road improvements have the potential to adversely affect water quality. Potential impacts and recommendations to minimize impacts from RR 259 road and bridge improvements were discussed previously under Tracked Vehicles. Improvements to RR 253 would be of the same preliminary scope as those for RR 259 (discussed under *Tracked Vehicles* section). Improvements would involve widening of the roadbed, tree clearing, culvert replacement, laying of a clay road surface, and possible bridge replacement/repair. Road improvements would adhere to the *Eglin Air Force Base Range Road Maintenance Handbook* (U.S. Air Force, 2001d) to minimize potential erosion impacts from road improvements and maintenance activities. Additionally, coordination with AAC/EMSN and AAC/EMCE, as well as acquisition of all appropriate state and federal permits, is required for road improvements and potential water quality and wetlands impacts.

Test Areas

Provided vehicles remain on existing roads, no adverse impacts to water quality are anticipated from wheeled vehicles on test areas.

4.8.1.3 Impacts from Aviation Operations

Aviation operations would not affect water quality. Rapid Ground Refueling activities have the potential to spill small amounts of petroleum fuels, but immediate spill response measures would be implemented. All spills would be reported and managed in accordance with AAC Plan 32-5, *Hazardous Waste Management Plan.*

4.8.1.4 Impacts from Munitions Use

Munitions use could potentially affect water quality through transport of munitions by-products to surface or ground waters, but amounts of by-products are anticipated to be minimal. More analysis on the transport of components from munitions use is provided in Section 4.10, Hazardous Materials/Solid Waste.

4.8.1.5 Impacts from Pyrotechnics

By-products from pyrotechnics would be minimal (see Section 4.10). No impacts to water quality are anticipated.

4.8.2 Alternative 1: Minimal Infrastructure Improvements

Under this alternative, no infrastructure improvements would occur at RR 259 and Wynnhaven Beach. Water quality impacts related to side disturbance and erosion would not occur. AAVs would not land at Wynnhaven Beach, and turbidity from LCAC and small boat landings would be minimal. Overall, potential impacts to water quality at landing sites would be fewer compared to the Proposed Action. Potential water quality impacts, and thus management practices for training occurring within the Eglin Military Complex would not be different from the Proposed Action.

4.8.3 No Action Alternative

ARG/MEU training would not be conducted at Eglin Air Force Base. Therefore, no impacts would occur.

4.9 AIR QUALITY

Project generated air emissions were analyzed to determine if:

- There would be a violation of a NAAQS.
- Emissions contributed to an existing or projected air quality violation.
- Sensitive receptors were exposed to substantial pollutant concentrations.
- There was an increase of 10 percent or more in tri-county criteria pollutants emissions.
- Any significance criteria established by the Florida State Implementation Plan (SIP) was exceeded.
- A permit to operate was required.
- A change to the Title V permit was required.

Air quality effects would occur during the training operations associated with the Proposed Action. Operational effects would be linked to combustive emissions that are generated by 1) amphibious landing/assault craft and small boats, 2) ground equipment such as tracked and wheeled vehicles, and 3) aircraft to include both fixed wing and rotary wing.

The methods selected to analyze air quality effects depend on the type of emission source being examined. The analytical methods are summarized here.

The primary emission sources associated with the Proposed Action include amphibious operations, ground transportation of troops, aircraft operations, and the expenditure of munitions/pyrotechnics on the Eglin ranges. Because the emissions generated by the various

MEU training exercises are considered temporary, analysis is limited to estimating the amount of combustive emissions emitted from mobile sources (amphibious landing craft, ground vehicles, and aircraft) and fugitive emissions from the expenditure of munitions/pyrotechnics. Analysis of mobile and stationary sources during the exercise phases consist of quantifying the emissions and evaluating how those emissions would affect progress toward maintenance of the national and state ambient air quality standards. Under existing conditions, the ambient air quality in Santa Rosa, Okaloosa, and Walton counties are classified as attainment for all criteria pollutants.

Fundamental steps in the evaluation of environmental effects on air quality are to identify the sources of the effect, identify the quantitative measures for evaluating the extent of the effect, and develop formulas for computing and assessing those measures. These formulations are based on the types of data that are generally available or can easily be collected for the Proposed Actions. For the Proposed Action, those emission sources anticipated to contribute to ambient air quality effects have been targeted for analysis: amphibious vehicles, ground support equipment, aircraft, and the expenditure of munitions.

Florida has developed a SIP as required by Section 110 of the Clean Air Act (CAA) to provide for the implementation, maintenance, and enforcement of the NAAQS for each air quality region within the state. The SIP is the primary vehicle used by USEPA for enforcement of federal air pollution legislation.

Section 176(c) of the CAA provides the basis for the relationship between the SIP and federal projects. It states that no federal agency shall support or approve any activity or action that does not conform to an implementation plan after the plan has been approved or promulgated under Section 110. This means that federally supported or funded activities would not 1) cause or contribute to any new violation of any air quality standard, 2) increase the frequency or severity of any existing violation of any standard, or 3) delay the timely attainment of any standard or any required interim emission reductions or other milestones in any area. In accordance with Section 176(c), USEPA promulgated the General Conformity Rule that is codified as 40 CFR 51, Subpart W. The provisions of this rule apply to state review of all federal general conformity determinations submitted to the state pursuant to 40 CFR 51, Subpart W, and incorporated by reference at Rule 62-204.800, Florida Administrative Code. The Conformity Rule only affects federal actions occurring in nonattainment and maintenance areas. Since Eglin AFB is located in an attainment area, a conformity determination is not required.

For impact analysis, the estimated air emissions from the various phases of the two yearly training exercises, as well as the total emissions from the two planned exercises for the year, are compared to the summation of the Santa Rosa, Okaloosa, and Walton county 2000 emission inventories. Potential impacts to air quality are then identified as the total emissions of any pollutant that equals 10 percent or more of the combined pollutant emissions for that specific pollutant. The 10 percent criteria approach is used in the General Conformity Rule as an indicator for impact analysis for non-attainment and maintenance areas. However, for impacts screening in this analysis, a more restrictive criteria than required in the General Conformity Rule was used. Rather than comparing emissions from exercise activities to regional inventories (as required in the General Conformity Rule), emissions were compared to that of the three counties that encompass the Eglin Reservation (a smaller area).

4.9.1 Proposed Action

4.9.1.1 Impacts from Amphibious Landing

Combustive emissions from landing craft and small boats would be generated during amphibious landing operations in support of the different phases of the MEU training exercise. Specific mobile emission sources include LCACs, LCUs, AAVs, and small boats (Zodiacs).

Emissions from landing craft are calculated very much like those for non-road vehicles (see next section). Calculations of emissions from amphibious vehicles were based on published emission factors but also required the following information: size of engine, type of fuel, amount of fuel used, and/or hours of operation.

As can be seen in Table 4-13, estimated emissions from non-road vehicles are significantly less than 10 percent of the combined Santa Rosa, Okaloosa, and Walton county emissions, and therefore would not be expected to cause any potential adverse effect on ambient air quality. Any emissions effects would be temporary and would fall off rapidly with distance from the exercise site. Due to the short-term effect of exercise-related fugitive combustive emissions from non-road vehicles and the small area affected, there would be no potential adverse cumulative impact on air quality associated with exercise-related activities.

4.9.1.2 Impacts from Ground Movement

Combustive emissions from wheeled and tracked vehicles would be generated during amphibious landing operations in support of the different phases of the MEU training exercise. Specific mobile emission sources include HMMWVs, AAVs, LAVs, 7-ton trucks, fuel trucks, earthmovers, bulldozers, and MIA1 tanks. Total annual ARG/MEU readiness emissions are presented in Table 4-20.

Table 4-20. Total Annual ARG/MEU Readiness Training Emissions

Pollutant Emission Source	Pollutants (tons/year)				
	CO	**NO_X**	**PM_{10}**	**SO_X**	**VOCs**
Eglin AFB Stationary Emissions (CY2000)	95	118	115	17	106
Eglin AFB Mobile Source Emissions (CY2000)	14,429	5,600	4,233	1,538	3,924
Eglin AFB Totals	**14,524**	**5,718**	**4,348**	**1,555**	**4,030**
Santa Rosa County (CY2000)	34,438	10,611	516	3,952	4,629
Okaloosa County (CY2000)	91,361	8,709	3,930	406	11,958
Walton County Total Emissions (CY2000)	23,553	2,972	172	162	2,913
County Totals	**149,352**	**22,292**	**4,618**	**4,520**	**19,500**
MEU Emissions					
Amphibious Landings	5.40	1.72	0.10	0.04	2.58
Percent of County Emissions	0.00	0.01	0.00	0.00	0.01
Ground Movement	2.22	8.80	1.92	0.44	0.54
Percent of County Emissions	0.00	0.04	0.04	0.01	0.00
Aviation Operations	14.20	16.46	2.22	0.92	1.16
Percent of County Emissions	0.01	0.07	0.05	0.02	0.01
Munitions/Pyrotechnics Use	0.00	0.01	0.03	0.00	0.00
Percent of County Emissions					
Total MEU Emissions	**21.82**	**26.99**	**4.27**	**1.40**	**4.28**
Percent of County Emissions	**0.01**	**0.12**	**0.09**	**0.03**	**0.02**

Motor vehicles are usually grouped into two categories: highway and non-road. Highway vehicles range in size from gasoline-powered motorcycles and cars to large diesel-powered tractor-trailers. USEPA has developed "averaged" emission factors that consider a number of variables (vehicle speed, operating temperature, altitude, fuel consumption, etc.) by weighting them according to national averages and standards. The emission factors are expressed in the form of grams of pollutant per vehicle mile traveled. Emission factors are available for several generic vehicle classes. The two classes used for this evaluation included: 1) light duty diesel-powered trucks (gross vehicle weight of 8,500 pounds or less) and 2) heavy duty diesel-powered vehicles (gross vehicle weight exceeding 8,500 pounds). Therefore, pollutant emissions from highway vehicles were based on the classification/size of the vehicle, fuel type, and miles driven.

One ground support vehicle, the HMMWV, was placed in the light duty diesel-powered classification. The remainder of the wheeled transportation vehicles were placed in the heavy-duty classification, including the AAV. (The AAV was placed in this category since it was operated as more of a highway vehicle and miles driven could be estimated more easily than hours operated).

Emission factors for non-road vehicles usually take the form of pollutant emissions per work unit, since these vehicles primarily perform work instead of traveling distance. As in the case of highway vehicles, USEPA has developed emission factors for numerous non-road vehicle classes. In addition, emission calculations require additional data to include the number of vehicles in each class, engine power (horsepower), type of fuel, and the activity level (hours of

operation). Vehicles that were placed in the non-road category included construction equipment such as the bulldozer and earthmover. The M1A1 tank was treated separately since it is turbine powered. Refer to the aviation section below to see how pollutant emissions were calculated for this vehicle.

As can be seen in Table 4-13, estimated emissions from non-road vehicles are significantly less than 10 percent of the combined Santa Rosa, Okaloosa, and Walton county emissions, and therefore would not be expected to cause any potential adverse effect on ambient air quality. Any emissions effects would be temporary and would fall off rapidly with distance from the exercise site. Due to the short-term effect of exercise-related fugitive combustive emissions from non-road vehicles and the small area affected, there would be no potential adverse cumulative impact on air quality associated with exercise-related activities.

4.9.1.3 Impacts from Aviation Operations

Combustive emissions from aircraft would be generated during aviation operations in support of the different phases of the MEU training exercise. Specific aircraft emission sources include CH-53, CH-46, UH-1N, and AH-1N rotary wing aircraft, and AV-8B and F-18 fixed wing aircraft.

Calculations of pollutant emissions from aircraft operations for each phase of the exercise were based on the number of landing-takeoff (LTO) cycles and the flight time below 3,000 AGL. An LTO cycle includes an approach from 3,000 feet AGL to the airfield, landing, taxi-in to a parking position, taxi-out to the runway/flight deck, take-off, and climb-out to 3,000 AGL. The 3,000 feet AGL ceiling was assumed as the atmospheric mixing height above which any pollutant generated would not contribute to increased pollutant concentrations at ground-level. Therefore, all pollutant emissions from aircraft generated above 3,000 feet AGL were excluded from the analysis.

The rates of emissions from aircraft engines vary according to the various modes of engine operation utilized during the LTO. For the various flight modes, published fuel flow rates, emission factors, and times-in-mode were used for estimating pollutant emissions from the various aircraft engines (U.S. Air Force, 2001a). Each flight profile is characterized by one or more modes-of-operation or power settings (e.g., takeoff, climbout, approach, taxi, or straight-line flight at a specific power setting). The USEPA has published default times-in-mode for various categories of aircraft (e.g., military transport, military combat, commercial, general aviation, etc.). These default times-in-modes were used for the LTO portion of the flight profiles.

As can be seen in Table 4-19, estimated emissions are significantly less than 10 percent of the combined Santa Rosa, Okaloosa, and Walton county emissions, and therefore would not be expected to cause any potential adverse effect on ambient air quality. Any emissions effects would be temporary and would fall off rapidly with distance from the exercise site. Due to the short-term effect of exercise-related fugitive combustive emissions from aircraft and the small area affected, there would be no potential adverse cumulative impact on air quality associated with exercise-related activities.

4.9.1.4 Impacts from Munitions Use

Combustive emissions from munitions and pyrotechnics (smokes and flares) would be generated during live fire from ground-based troops and vehicles, as well as aircraft in support of the different phases of the MEU training exercise. Munitions/pyrotechnics cover a wide range of items, from 5.56 mm cartridges to MK83 bombs.

Calculations of pollutant emissions from munitions and pyrotechnics were based on emission factors maintained by USEPA. The emission factors are in units of mass of pollutant emitted per mass of energetic material detonated. At this point, a rough estimate of the types and quantities of various items that would be expended during the exercise has been made and the weight of the energetic material (net explosive weight) contained in each item has been determined. Once the total weight of the energetic material was accomplished, a generic set of emission factors was applied against this weight of material to calculate pollutant emissions. The generic emission factors were based on the detonation of TNT.

As can be seen in Table 4-19, estimated emissions are significantly less than 10 percent of the combined Santa Rosa, Okaloosa, and Walton county emissions, and therefore would not be expected to cause any potential adverse effect on ambient air quality. Any emissions effects would be temporary and would fall off rapidly with distance from the exercise site. Due to the short-term effect of exercise-related fugitive combustive emissions from aircraft and the small area affected, there would be no potential adverse cumulative impact on air quality associated with exercise-related activities.

4.9.1.5 Summary of Air Emissions Impacts

Table 4-19 lists potential air emissions impacts associated with the proposed MEU training exercises and total Eglin and County air emissions for comparison. From the table, it is evident that potential MEU training emissions would not contribute substantially to overall area emissions. No significant air quality impacts would occur from the Proposed Action.

4.9.2 Alternative 1: Minimal Infrastructure Improvements

Air quality impacts would not differ from the Proposed Action. The number of vehicles and aircraft and degree of activity would be the same. Some localized decrease in emissions would be experienced under this alternative at Wynnhaven Beach given that fewer vehicles would land during at this location during the 10-day period; however, overall emissions from the ARG/MEU event would not change.

4.9.3 No Action Alternative

ARG/MEU training would not be conducted at Eglin AFB. Therefore, no impacts would occur.

4.10 HAZARDOUS MATERIALS/SOLID WASTE

4.10.1 Proposed Action

The transport, storage, use, and disposal of hazardous materials and waste associated with the Proposed Action present a safety/health issue to military personnel and/or the public. Potential

impacts are defined as the degree to which actions requiring the use, storage, and/or transport of hazardous materials and actions resulting in the generation, storage, transport, and disposal of hazardous wastes increase or decrease safety/health risks to military personnel and the public. The hazardous materials to be transported, stored, and used on site for the Proposed Action consist of fuels, munitions, and pyrotechnics.

Explosives storage and transport is an ongoing part of the test environment on Eglin AFB. The transportation of explosive ordnance from Eglin Main to other areas of the reservation is governed under Air Force Manual (AFMAN) 91.201, *Explosive Safety Standards*. Explosives storage areas must be sited according to Air Force requirements, and portions of public roads that periodically serve as routes for explosive-laden vehicles to facilitate Eglin AFB activities are established according to strict Air Force safety requirements.

The storage, transport, and handling of hazardous material would be coordinated with AAC/EMCE, and these materials would be disposed of appropriately according to state and AAC Plan 32-5, *Hazardous Waste Management Plan*. AAC Plan 32-9 *Hazardous Materials Management* describes how Eglin AFB complies with federal, state, Air Force, and DoD laws/instructions. The Marine Corps will follow this plan while operating on Eglin AFB. In addition, all brass casings in interstitial areas will be retrieved and disposed of in accordance with AAC Plan 32-5 and AAC Plan 32-9.

To avoid potential impacts from Installation Restoration Program sites (Figures A-67 through A-70, IRP Sites) digging during training activities should be coordinated with AAC/EMR.

4.10.1.1 Impacts from Amphibious Landing

Inadvertent Release

The inadvertent release of hazardous materials could take place during the following activities:

- Insertion of Forward Command Element
- Amphibious Landing Rehearsal
- Mechanized Raid Wet
- MEU Landing
- Non-combatant Evacuation Operation
- Withdrawal

In the event that mechanical failures produce leaks or should spills occur during amphibious landings, the following procedures will be followed.

- Spill clean-up when appropriate by on-site Marines should be performed following Eglin's or Hurlburt's spill response procedures.
- Any environmental spill must be reported to the Spill Response Manager in accordance with AAC Plan 32-5. Within four hours of a spill event on Eglin, a Spill Response Form must be faxed (882-7675) to AAC/EMC. Spills on Hurlburt would be reported to the Hurlburt Field Fire Department, 16 CES/CEF (884-6360) who would then coordinate with Hurlburt Spill Team, Environmental Management, or other appropriate organization.

Spills over 25 gallons would be reported to the FDEP (through AAC/EMC or Hurlburt Environmental Management).

4.10.1.2 Impacts from Ground Movement

Litter/Refuse From Daily Mission Activities

Approximately 2,000 ground troops would be inserted during MEU training. Troops would be delivered to training objectives primarily by helicopter. However, approximately 200 troops may insert at each of the following locations during any training event: Santa Rosa Island, East Bay Point, TA D-84, and White Point. Elements requiring ground troop movement per event include:

- R&S Insertion – 5
- Helicopter Raid – 180
- Small Boat Raid – 150
- Mechanized Wet Raid - 180
- Mechanized Dry Raid - 180
- SACEX - 250
- Direct Action – 75

Ground training operations would include movement from insertion points to objective sites. Interstitial areas would be traversed. Interstitial sites are those areas within the Eglin Military Complex excluding cantonment areas (Eglin Main Base, Hurlburt Field, Duke Field, and Choctaw Field), established test areas, and leased land. Interstitial areas comprise approximately 385,000 acres of the Eglin Military Complex.

Debris, such as shell casings, canisters from signal smokes, flares, and chutes from flares, as well as litter and refuse from ground troop movement, may be deposited from ground troop activities. If left in place and not properly disposed of or packed out, this debris and refuse have the potential to result in environmental impacts. AAC Plan 32-5 and AAC Plan 32-9 will be complied with for the ARG/MEU exercises for recycling, hazardous materials management, and proper disposal of wastes.

The *Interstitial Area Final Programmatic Environmental Assessment* (U.S. Air Force, 1998c) analyzed the environmental impact of increasing yearly ground troop movement in interstitial spaces from 55,800 troops per year (1997) to 167,500, equal to 200 percent. No environmental impacts were determined from the 200 percent increase in ground troops regarding debris and the use of blanks, smokes, and flares during ground troop training activities in interstitial spaces.

Personnel movement may occur on established roads, along or across streams, through cleared areas or wooded areas, and through swamp environments. Most ground training on foot involves movement without leaving any evidence of troop presence. Impacts from litter or refuse at insertion points, test areas, and interstitial spaces from 2,000 additional ground troops for the Proposed Action are not anticipated if the following mitigations are adhered to:

- Pack out debris and refuse packed in or properly dispose of litter (FAC 62-701).
- Remove and properly dispose of solid debris from blanks, chaff, smokes and flares in accordance with Eglin operating procedures.
- Restrict troop movement on foot from sensitive sites (FNAI, Tier I) most susceptible to impact when non-sensitive sites may be used as an alternative.
- Conduct postmission surveys to ensure debris has been removed.

4.10.1.3 Impacts from Aviation Operations

Rapid Ground Refueling

The Rapid Ground Refueling (RGR) element entails the use of KC-130s and CH-53s to refuel aircraft (primarily helicopters) at select Auxiliary Fields, all C-130 capable airfields, and select landing zones for CH-53s. The helicopters land, taxi to fueling stations, and rapidly "top off" fuel tanks, then depart. The fueling hoses are then retracted and the fueling aircraft depart.

Information regarding total quantities of fuel for RGR activities is not available. However, it is possible to determine approximate RGR based on capacity specifications. It is estimated that approximately 51,760 gallons of fuel would be used during the RGR element per 10-day training cycle (Table 4-21).

Adverse environmental impacts are not anticipated; established refueling protocols and BMPs would be followed. Spill response kits (pads and booms) would be available during RGR activities. Spill clean-up would be performed, when appropriate, by on-site Marines, following Eglin's or Hurlburt's spill response procedures. Any environmental spill must be reported to the Spill Response Manager. Within four hours of the spill event, a Spill Response Form must be faxed to AAC/EMC (882-7675) for Eglin and to 16 SOW CES/CEV (884-2580) for Hurlburt. Spills over 25 gallons would be reported to the FDEP (through AAC/EMC for Eglin, 16 SOW CES/CEV for Hurlburt).

Table 4-21. Fuel Use for Rapid Ground Refueling

Vehicle/Craft	Number (Available for use)	Total Use (4 Events/10 day cycle)	Fuel Capacity of Craft (Gallons)	40% of Fuel Capacity- "top-off" (Gallons)	Total Fuel RGR (Gallons)
HMMWV	103	412	25	10	4,120
CH-46 Sea Knight Helicopter	12	48	668	267	12,816
CH-53 Super Stallion Helicopter	6	24	2,277	911	21,864
UH-1N Huey Helicopter	2	8	215	86	688
AH-1W Super Cobra Helicopter	4	16	200	80	1,280
AV-8B Harrier Attack Jet	6	24	1,144	458	10,992
Total Fuel Expenditure RGR					51,760

4.10.1.4 Impacts from Munitions Use

Munitions would be used for live fire exercises from ground-based troops and vehicles as well as from air delivery of larger munitions. Munitions use includes the use of blank munitions during raids.

Several compounds in the explosive formulations of munitions may be classified as toxic or harmful; these products may be released to the environment in the form of residues after detonation or may be deposited intact if the munition item fails to function as designed. (Note: Unexploded ordnance [UXO] are munition items that fail to function as designed and are the primary source of unintended chemical releases to the environment). The combustion of high explosives may also result in the production of a variety of toxic volatile and semivolatile organic compounds. The combustion of rocket propellant or propellant charges produces these same products.

Metallic by-products are also produced during training or testing operations. The steel casing from gun ammunitions, projectiles, grenades, etc., would be fragmented during detonation. The steel would eventually corrode in the soil as it is oxidized to form iron oxides. Small arms ammunition would have the potential to release copper, zinc, and lead. Other metals that may reach the environment include tin, aluminum, nickel, and antimony. Table 4-22 presents chemicals or compounds typically found in munitions items or generated as by-products during munitions-related operations.

Table 4-22. Chemicals/Compounds Associated with Expendables

Metals in Alloys of Casings and Other Solid Munitions Components				
Cadmium	Chromium	Copper	Lead	Nickel
Metal Compounds in Propellant, Energetic, and Pyrotechnics (PEP); Paints; Coatings				
Antimony	Chromium	Lead	Zinc	
Barium	Copper	Mercury		
Chemicals in Propellant, Energetic, and Pyrotechnics (PEP), and Paints and Coatings				
Dibutylphthalate	Diethylphthalate	Diphenylamine		
Dimethylphthalate	2,4,6-Trinitrotoluene (TNT)	Composition B		
RDX	HMX	2,6-Dinitrotoluene		
Ammonium Perchlorate	2,4-Dinitrotoluene	Nitroglycerine		
Possible By-products of Munitions Detonation or Destruction				
Ammonia	Hydrochloric acid	Sulfuric acid	Nitrate compounds	
Other Possible Products of Combustion				
1,3-Butadiene	Chlorine	Ethylbenzene	Hydrogen fluoride	
Carbon disulfide	Chloroform	Hydrogen cyanide	Hydrogen sulfide	
Carbon tetrachloride	Cyanide compounds	*n*-Hexane	Ethylene	
Carbonyl sulfide	Cyclohexane	Styrene		

Source: U.S. Army, 2002 (EPCRA Munitions Reporting Handbook for the U.S. Army)

Quantification of Munition Release Impacts

The first step in quantifying the potential impacts of munitions residue on the environment is to establish an accurate record of the types and quantities of munitions items used. The Range Utilization Report (RUR) details mission activities conducted on all Eglin ranges, including the types and quantities of munitions employed. Eglin generates the RUR on an annual basis and documents mission activities conducted during the previous fiscal year. Table 4-23 was

generated using RUR data and presents a list of munitions items expended on training ranges A-15, A-77, A-78, A-79, Auxiliary Fields 7 and 8, B-5, B-7, B-70, B-71, B-75, C-52N, C-53, C-62, and C-72 averaged over a 3-year period (1999–2001). A comparison was made to determine the percent increase of munition use from the SACEX, live fire, and direct action training.

Table 4-23. Percent Increase from Munitions Use

<table>
<tr><th>Expendable</th><th>Expendable Use C-52-N (Average 1999-2001)</th><th>Expendable SACEX Training</th><th>Percent (%) Increase Associated with SACEX</th></tr>
<tr><td>AGM Missile</td><td>1</td><td>8</td><td>800</td></tr>
<tr><td>Bomb</td><td>370</td><td>104</td><td>28</td></tr>
<tr><td>Gun</td><td>25,488</td><td>1,250</td><td>5</td></tr>
<tr><td>Small Arms</td><td>291,893</td><td>33,073</td><td>11</td></tr>
<tr><td>Warhead</td><td>81</td><td>249</td><td>307</td></tr>
<tr><th>Expendable</th><th>Expendable Use A-77, A-78, A-79, Auxiliary Fields 7 and 8, B-5, B-7, B-70, B-71, B-75, C-52N, C-53, C-62, and C-72 (Average 1999-2001)</th><th>Expendable Live Fire Training</th><th>Percent (%) Increase Associated with Live Fire</th></tr>
<tr><td>Missile</td><td>97</td><td>4</td><td>4</td></tr>
<tr><td>Bomb</td><td>393</td><td>0</td><td>0</td></tr>
<tr><td>Gun</td><td>145,199</td><td>350</td><td>0.2</td></tr>
<tr><td>Small Arms</td><td>1,630,932</td><td>150,238</td><td>9</td></tr>
<tr><td>Warhead</td><td>815</td><td>226</td><td>28</td></tr>
<tr><th>Expendable</th><th>Expendable Use A-15 (Santa Rosa Island) (Average 1999-2001)</th><th>Expendable Direct Action Training</th><th>Percent (%) Increase Associated with Direct Action</th></tr>
<tr><td>Missile</td><td rowspan="5">0</td><td rowspan="3">0</td><td rowspan="3">0</td></tr>
<tr><td>Bomb</td></tr>
<tr><td>Gun</td></tr>
<tr><td>Small Arms</td><td>19,530</td><td>100</td></tr>
<tr><td>Warhead</td><td>0</td><td>0</td></tr>
</table>

Source: U.S. Air Force, 2000a; U.S. Air Force, 2000b

In addition to the type and quantity of munition items, the constituent or chemical information, as well as potential by-products of detonation, of each munition item used must be identified. The Toxic Release Inventory-Data Delivery System (TRI-DDS) is a tool that can be used to estimate this information. The TRI-DDS, which is a product of the Joint Service Emergency Planning and Community Right-to-Know (EPCRA) Workgroup, is intended to provide a consistent method to assess chemical releases and waste management data across DoD.

Although primarily intended to evaluate munitions activities for the purposes of complying with EPCRA Section 313 reporting, the TRI-DDS may also be used to quantify chemical composition of munitions relating to training or testing activities. Table 4-24 presents TRI-DDS release estimates for the SACEX, live fire, and direct action exercises. The data in the table were calculated using TRI-DDS munition composition information.

Table 4-24. Total Chemical Quantity in Munition* - SACEX, Live Fire and Direct Action Training

Chemical	SACEX	Live Fire	Direct Action
Total Chemical in Munition (lb)**			
Aluminum	1,737	557	0.1
Antimony	2.6	12	0
Antimony Compounds	0.3	1	0.2
Barium Compounds	0.7	3	0.5
Boron	0.3	0.1	0
Carbon	48	3	0
Chromium	26	6	0
Cobalt	0.1	0	0
Copper	483	1,824	380
Dibutylphthalate	6	26	0
Dinitrotoluene (mixed isomers)	0	0	0.6
Diphenylamine	1	6	0.1
HMX	0.5	0.12	0
Iron	41,827	1,997	0.3
Lead	146	663	0
Lead (in brass, bronze, or stainless steel)	0.40	2	0.4
Lead compounds	19	8	0.6
Magnesium	2	0	0
Manganese	193	14	0
Molybdenum	1	0.2	0
Nickel	37	9	0
Nitroglycerin	35	64	0
Pentaerythritol Tetranitrate (PETN)	0.2	0.4	0.1
Phosphorus	18	1	0
RDX	11,732	1,718	0
Silicon	101	25	0
Sulfur	18	0.1	0
Tetryl	9	11	0
Titanium Tetrachloride	4	1	0
2,4,6-Trinitrotoluene (TNT)	7,562	1,124	0
Zinc	496	1,143	162

* Source: TRI-DDS version 3.1, using RUR 2002 data
** Total chemical quantity contained in intact munition
Note: The detonation of the munition item may result in the destruction of the chemical and/or a release of the chemical to the air.

Blanks

Several elements would utilize blanks during training at multiple sites on Eglin AFB. Information from the RUR was obtained to quantify current blanks expended at proposed objective areas (Table 4-25).

Table 4-25. Blank Use Inventory for Raid Missions by Average Over 3 Fiscal Years (1999-2001)

Site	Blanks Expended (Average – 1999-2001)
Auxiliary Field 1	29,975
Auxiliary Field 3	1,933
Auxiliary Field 6 (B-6)	299,032
Auxiliary Field 7 (B-12)	165,261
Test Area B-75	17,171
Santa Rosa Island	45,609
Eglin AFB Airspace	
NSC	13,491
R-2914A	10,433
R-2915A	558,278
R2915B	1,784
R-2915BC	9,344
Total Eglin Range (Average 1999-2001)	**1,152,311**

Source: Range Utilization Report Database, 1999-2001

Proposed Blank Use for ARG/MEU Training

Table 4-26 provides information regarding potential blank use during listed training elements. Total average annual use of blanks on the Eglin Range was 1,152,311. A total of 64,160 blanks may be expended during ARG/MEU training, reflecting a 5.6 percent increase in annual use for the Eglin Range.

Table 4-26. Potential Blank Use Inventory for MEU Training

	Insertion R&S	Helo Raid	Small Boat Raid	Mech Raid Wet	Mech Raid Dry	MEU Landing	Total – Potential Maximum Use*
5.56 mm Blank	500	24,360	24,360	24,360	24,360	24,360	51,360
7.62 mm Blank	1,000	9,200	9,200	9,200	9,200	9,200	12,800
Total Eglin Range							64,160

*Total potential use at all test areas for ARG/MEU training

Chemical Constituents in Blanks

The firing of blanks requires small amounts of a special powder. For example, the 5.56 mm blanks and the 7.62 mm blanks require 0.0011 pounds and 0.0026 pounds of powder, respectively (U.S. Air Force, 1996c). Thus, an addition of 88 total pounds of powder could potentially be expended during training from the use of blanks. This propellant is composed primarily of nitrocellulose. Combustion of this propellant converts 99 percent of the original material to gaseous products: carbon dioxide (CO_2), nitric oxide (NO), and nitrogen dioxide (NO_2). It is not anticipated that a 5.6 percent increase in blank use on the Eglin Range would cause adverse environmental impacts.

Environmental Fate of Munitions Residue

Once released into the environment, the fate and transport of chemicals through water and soil are complex phenomena. Organic molecules from explosives formulations or generated during

explosive detonations interact with soil components and soil water; move through the soil by diffusion and advection; change from vapor state, are dissolved in soil water, and are sorbed on stationary soil solid phases, and are chemically transformed by microorganisms and soil minerals. Metals released to the soil would typically be much less mobile in the environment. Movement of metals into other environmental compartments (i.e., ground water, surface water, or the atmosphere) is expected to be minimal as long as the retention capacity of the soil is not exceeded. The extent of movement of a metal in the soil system is intimately related to the solution and surface chemistry of the soil and to the specific properties of the metal and associated waste matrix. Changes in the chemical environment (especially pH and reduction/oxidation conditions) may result in very different relative chemical mobility for the components—acidic and/or reducing conditions may increase dramatically the mobility of the metals in the environment. Environmental fate and transport characteristics of chemicals common to munitions or munition residues are presented in Appendix I, Table I-1. Environmental Fate and Transport of Common Munition/UXO Chemicals.

The primary release mechanisms are residues associated with the successful detonation of munition items or residues associated with the breakup, either on impact or due to subsequent corrosion, of UXO. Both of these mechanisms would result in release of metallic and organic compounds to the ground. Additionally, the detonation process would release a variety of organic, inorganic, and metallic compounds to the air as gases, vapors, or particulates.

Depending on the medium and chemical released, migration of contaminants would be through percolation of liquid into shallow groundwater or runoff carrying contaminated particles into surface water. Contaminant soil transport would only be significant if soils were transported off-site. Surface water has the potential to be impacted by overland flow crossing test areas and picking up contaminants that are transported to streams. Shallow groundwater could be impacted if explosives or their metabolites were transported from soils to groundwater. Potential receptors of munition residue include on-site personnel, recreational users/trespassers, adjacent residents, and aquatic and terrestrial biota.

Toxicity Assessment of Munition Residue

A toxicity assessment examines the toxicity (harmfulness) of chemicals by comparing chemical concentrations with established criteria for cancerous and noncancerous health effects. For chemicals known to cause cancer, <u>any</u> exposure is thought to be able to cause cancer. The likelihood of cancer resulting from exposure to a chemical is expressed a probability (such as "a 1 in 1 million chance"). For noncancer adverse effects, low exposures may not cause harm, and corresponding threshold values have been developed. Exposures below the threshold value are considered safe, and values above are considered harmful.

Human and ecological effects of munition and UXO residue is dependent upon both the availability and the concentration of the contaminant in the environment that is either inhaled, absorbed, or ingested by the receiving organism. Some contaminants, such as lead, can cause adverse effects to humans and biota at very small exposure concentrations. The effects vary between chemical contaminants, routes of exposure, and the organisms that are exposed.

Table I-2, Human and Ecological Health Effects of Typical Munitions Residue, in Appendix I provides a summary of the potential adverse effects and carcinogenicity class from exposure to common munition residues/chemicals. Two of the organics listed in the table (RDX and TNT) and two of the metals (lead and zinc) have been identified as possible carcinogens. Due to very low concentrations and low likelihood of exposure, the environmental risks associated with munitions residues from the proposed action is insignificant.

4.10.1.5 Impacts from Pyrotechnics

Raids on objective sites with opposing forces acting as resistance involves the use of pyrotechnics (smokes and flares). Additionally, the AAVs also use smoke when traveling from ship to shore.

The following elements would use smokes and flares during MEU training activities:

- SACEX
- Live Fire Maneuver
- Helicopter Raid
- Small Boat Raid
- Mechanized Wet Raid
- Mechanized Dry Raid
- MEU Landing
- Direct Action

Smokes

Ground training operations may require the use of signal smokes during the training mission. Signal smokes are different from screening smokes in that a dye is used for signaling and marking. These smokes are primarily used to provide signaling and communication on the ground-to-ground crews or aircrews. Signal smokes are disseminated as the M-18 smoke grenade (only smoke in use) and may give off yellow, green, red, or violet colored smoke. The M-18 smoke grenade is ignited and can be thrown approximately 35 meters by the average Marine.

Flares

Flares are devices composed primarily of magnesium and ignited to produce heat or light. Flares that produce heat are used as decoys for self-protection purposes, and the flares that produce light are used for signaling and illumination. Self-protection flares are jettisoned from aircraft and are designed to generate heat (approximately 2,000°F) to defeat enemy heat-seeking missiles. The flares are designed to burn out quickly (approximately 10 seconds) and are consumed before reaching the ground surface. Illumination flares are similar in composition to self-protection flares and are normally aircraft-launched and used for nighttime illumination of surface areas in search and attack operations. Although they have a longer burn time than

self-protection flares, they are designed to burn out prior to reaching ground surface. Signaling flares, including slap flares and distress flares, are small and burn out quickly (within 10 to 15 seconds).

Table 4-27 lists an inventory of pyrotechnics used on Eglin AFB averaged over a 3-year period at proposed objective sites and over Eglin AFB airspace.

The environmental fate and transport, health effects, and an exposure assessment of the chemical constituents of pyrotechnics is provided in Appendix I, Table I-6, Environmental Fate and Transport, Health Effects, and Exposure Assessment for Pyrotechnics.

Table 4-27. Comparison of Expendables Inventory for Raid Missions by Average Over 3 Fiscal Years (1999-2001) to MEU Training

Eglin Raid Missions (1999-2001)		
Site	**Flares**	**Smokes**
Auxiliary Fields	8,598	4,775
B-75	350	233
Hammock Point	0	220
Santa Rosa Island	3	21
Eglin Airspace Over Objective Sites	169,230	10,404
Total Eglin Range	**178,181**	**15,653**
Total MEU Training	**1,100**	**301**
Percent Increase	0.6	1.9

Source: Range Utilization Report data 1999-2001

Approximately 1,100 flares and 300 smoke grenades will be expended on or over the Eglin Range during MEU training. The percent increase in use at on the Eglin Range would not be significant as flare and smoke use would only increase 0.6 percent and 1.9 percent, respectively. Adverse impacts from munitions residues released from the additional smokes and flares used during MEU training on the Eglin Range are not anticipated.

Simulators

Simulators are used to mimic ordnance items by emitting blasts, noise, or flashes without emitting fragments. Table 4-28 lists simulator use during training exercises. Due to the small number of simulators and the wide projected distribution, adverse impacts from simulator residues are not anticipated.

Table 4-28. Simulator Inventory for MEU Training

Simulator	Live Fire Maneuver	Insertion R&S	Helo Raid	Small Boat Raid	Mech Raid Wet	Mech Raid Dry	MEU Landing
M22 Rocket	100						
Blast, TOW	25						
Projectile Ground Blast			4	4	4	4	4
Flash, Booby-trap		4	12	12	12	12	12
Flash Illumination Booby-trap		4	12	12	12	12	12
M21 Flash Artillery			4	4	4	4	4
Noise	24						

4.10.2 Alternative 1: Minimal Infrastructure Improvements

Minimal infrastructure improvements would not influence the number of munitions expended during training activities; thus, potential impacts are the same as for the Proposed Action.

4.10.3 No Action Alternative

MEU training would not be conducted at Eglin AFB. Therefore, no impacts would occur.

4.11 SENSITIVE SPECIES

4.11.1 Proposed Action

4.11.1.1 Impacts from Amphibious Landing

Amphibious vehicles are designed to transition from the water to land. Some, such as AAVs may contact the ocean or estuarine floor, sometimes creating ruts and depressions and stirring up bottom sediments. Small boats would make some contact with riverine or estuarine substrate but due to their shallow draft and lack of a propeller would do so to a much lesser degree than AAVs. LCACs would not disturb bottom habitats but do create disturbance in the transit across the landing area. Amphibious landings would potentially affect sea turtles, Gulf sturgeon, and marine mammals.

Sea Turtles (*Caretta caretta, Chelonia mydas, and Dermochelys coriacea*)

Gulf Density Estimates of Sea Turtles

Adults

Abundance and density data from the aerial survey portion of the GulfCet study best reflect the abundance and density of sea turtles within the area of interest. The survey area is known as the Minerals Management Service Eastern Planning Area and may be divided into continental shelf and slope regions.

In order to provide improved species conservation and protection, the species density estimate data were adjusted to reflect a more realistic situation and consider (1) temporal and spatial variations, (2) surface and submerged variations, and (3) overall density estimate confidence.

<u>Temporal and Spatial Variations:</u> The GulfCet II aerial surveys have identified different density estimates of sea turtles between winter and summer seasons, as well as between the shelf and slope geographic locations. Accordingly, the greatest species density estimate available for any given season or location was utilized for conservative impact assessments.

<u>Surface and Submerged Variations:</u> The GulfCet II surveys focus on enumerating animals detected at the ocean surface and therefore do not account for submerged animals. As such, the surveys do not provide a relative density estimate for the entire potential population of a given species. To provide a more conservative impact analysis, density estimates may be adjusted to account for submerged individuals. The species considered in this assessment are at the surface

approximately 10 percent of the time (Moore and Clarke, 1998). Impacts are considered both by taking submergence into account and by considering surface time.

<u>Density Estimate Confidence:</u> The density estimates of sea turtles resulting from GulfCet II aerial surveys were determined with an associated standard deviation and resulting coefficient of variation. Each of these analyses provides a measure of confidence about the resultant density estimate. An upper confidence value of 2.576 standard deviations (approximately a 99 percent confidence level) was utilized to further adjust the density estimate for each species.

Table 4-29 summarizes adjusted density estimates for sea turtles.

Table 4-29. Sea Turtle Densities Based on GulfCet II Surveys

Species	Individuals/ 100 km^2	Individuals/ mi^2	Adjusted Density (per mi^2) Surfaced Individuals	Adjusted Density (per mi^2) Total Population
Loggerhead	4.253	0.1102	0.1753	1.1667
Leatherback	0.327	0.0085	0.0211	0.0973
Kemp's ridley	0.097	0.0025	0.0100	0.0326
Unidentified	0.340	0.0088	0.0191	0.0984

Although no green sea turtles were identified by GulfCet II surveys, this species is known to occur, at least periodically, offshore of Eglin Air Force Base. Green turtles nest every other year on beaches along Santa Rosa Island, including Eglin property and adjoining areas. It is assumed that the turtles labeled as "unidentified" during the GulfCet II surveys include green turtles.

Juveniles/Hatchlings

In addition to adult turtles, hatchlings are present at certain times of the year. Loggerhead turtles nest most years on Santa Rosa Island, and green turtles nest every other year. Leatherback turtles nest on the island infrequently. Nesting generally occurs between May and August, and the incubation period is approximately 60 days. Eglin AFB has maintained turtle hatchling data since 1998. The number of hatchlings that emerged from the nests (as opposed to the total number of eggs) is shown in Table 4-30.

Table 4-30. Emergent Turtle Hatchlings on Santa Rosa Island

Species	1998	1999	2000	2001	2002
Loggerhead	77	966	2,831	200	379
Green	147	0	1,401	0	361
Leatherback	0	0	58	0	0

Almost all of the hatchlings emerged during the months of August and September. Averaging the number of emergent hatchlings per year and dividing by the number of days in the months of August and September results in the maximum number of hatchlings in the water per day during these two months (Table 4-31). A density estimate for hatchlings in the water can be reached by using the length of shoreline surveyed (17 miles) and a distance offshore with the conservative

assumption that the hatchlings remained generally within that area. If the offshore distance is chosen to be 10 miles (to be consistent with previous analyses), the total area is 170 square miles. Assuming that all hatchlings move into the area of study and are uniformly distributed, the resulting density is shown in Table 4-31. A large number of emergent hatchlings probably would not reach the water, or would perish soon after entering the water because of predation and other factors, but this analysis assumes a 100 percent survival rate.

Table 4-31. Number and Density of Emergent Hatchlings Per Day During August and September

Species	# of Emergent Hatchlings	Density (per mile^2)
Loggerhead	15	0.088
Green	10	0.059
Leatherback	1	0.006

Under the Proposed Action, effects to federally protected sea turtle species could potentially occur as a result of direct physical contact with surface vessels transitioning between offshore ships and the shoreline. The vessels include LCACs, AAVs, LCUs, and Zodiacs.

The action area consists of the transit area between Navy ships and Santa Rosa Island, which encompasses a rectangle 7 miles wide (i.e., the width between A-11 and A-15) out to a distance of about 10 miles offshore, plus the ship offshore operations of the ARG, which consists of three amphibious ships and two to three cruisers/destroyers within an area known as the Inner Transport Area. The ships would primarily remain in a fixed position for durations of 3 to 4 days, and if moving would do so at speeds of 5 to 10 knots. The Inner Transport Area encompasses an area about 5 × 20 miles or roughly 100 square miles. Due to the low number of ships and infrequency of movement within the Inner Transport Area, this area has been eliminated from analysis. Therefore, the total area of operations considered for impacts analysis is 70 square miles.

Methodology for Effects Estimation: The impact calculations for this section utilize sea turtle density estimates that have been derived from aerial surveys during the GulfCet II surveys. Ships and aircraft were used to collect sea turtle sighting data from 1996 to 1998.

During the 10-day period of ARG/MEU exercises, there are expected to be 130 crossings of LCACs between the Navy ships and shore (65 round trips), 78 crossings by AAVs, and 42 crossings by LCUs. LCACs are the largest vessels and their beam measurement (width) is used for conservative impact analyses. An LCAC is 47 feet in beam width, which is 0.0089 miles. For analysis, the distance from Navy ship to shore was conservatively assumed to be 10 miles, so the total surface area potentially impacted per trip is 0.089 square miles. Multiplying this number by the total number of crossings results in a total water surface area of 22.25 square miles. The estimated density of surface and submerged sea turtles within the vessel transit areas is presented in Table 4-32.

Table 4-32. Number of Offshore Sea Turtles Within Vessel Transit Areas

Species	Number of Sea Turtles at the Surface	Number of Surface and Submerged Sea Turtles	Number of Hatchlings
Loggerhead	3.9	26.0	2.0
Leatherback	0.5	2.2	0.1
Kemp's ridley	0.2	0.7	0
Unidentified	0.4	2.2	N/A
Green	*	*	1.3
TOTAL	**5**	**31**	**3.4**

* Turtles listed as unidentified by GulfCet II are assumed to include green sea turtles. N/A = not applicable.

Effect Estimates

The above table indicates that the expected maximum number of sea turtles within the vessel transit area is less than 35 based on conservative estimates. Realistically, any effects would be limited to turtles at the surface, including hatchlings; thus, some number less than nine (surface turtles plus hatchlings) turtles would occupy the surface of the entire transit area at any given time over the 10-day duration of the exercise. Some percentage of these nine individuals may be affected through direct or near contact with a boat or amphibious vessel, but the likelihood is considered remote. Adult turtles would likely avoid collision because the LCUs move very slowly and the LCACs produce loud noise that might be detected some distance away. Thus, the greatest potential risk would be related to direct contact with hatchlings during nesting season.

Activity occurring during nesting season may affect but is not likely to adversely affect less than nine sea turtles.

Activity occurring outside of nesting season is not likely to adversely affect sea turtles.

Avoidance and Minimization Measures for ARG/MEU Training

- Sea turtles have been associated with drifting *Sargassum*. Avoiding large mats of *Sargassum* during the day may minimize potential impacts.
- Nest relocation, proposed as a minimization measure for ARG/MEU beach landings, would move nests outside of the operation area, potentially reducing the number of hatchlings in the transit area.

Gulf Sturgeon (*Acipenser oxyrinchus desotoi*)

Small Boat Landings

Yellow River - Gulf sturgeon are found in the lower Yellow River and appear to congregate near the HWY 87 Bridge and up to a few miles north of the bridge (Craft et al., 2001). Presently, there are no designated critical habitat areas for the Gulf sturgeon (USFWS, 1998), but the area of the Yellow River from Boiling Creek to HWY 87 appears to be an important summer habitat for the sturgeon. Activities along the shore of this area that could cause potential impacts would be small boat landings (Zodiac boats only) from an R&S insertion or a small boat raid. Heavy sediment loads and low water volume from drought conditions were identified as factors

potentially affecting sturgeon migration in the Yellow River. Erosion and siltation can cause eggs to be covered with sediment and prevent offspring from reaching the water column. No potential spawning sites occur within the 10 river miles of the Yellow River (Craft et al., 2001). Zodiac boats are not considered to have impacts to sturgeon habitats because of the shallow draft. Erosion and turbidity from boat landings would be minimal and would not affect known spawning sites. The landings would not result in any significant increase in shoreline small boat landings over what currently occurs as part of normal Eglin operations (approximately 1,500 per year at a number of landing sites throughout the reservation). Erosion and turbidity from small boat landings are not widespread or significant enough to affect the Gulf sturgeon through habitat alteration.

<u>Alaqua Point</u> – Wintering Gulf sturgeon have been found to congregate near Alaqua Point along the northern sections of Choctawhatchee Bay approximately 1,000 feet from shore (Paruka, personal communication, 2003). Gulf sturgeon do not enter waters less than two feet in depth and prefer depths of approximately 6.5 to 13 feet (Paruka, personal communication, 2003). Zodiac boats are not considered to have impacts to sturgeon habitats because of the shallow draft. Also, no potential spawning sites occur in the Choctawhatchee Bay; therefore, erosion and turbidity from boat landings would be minimal and would not affect known spawning sites. The area affected would be above the 2-foot bathymetry line (maximum depth for small boat landings) to the shoreline. The small amounts of erosion and turbidity from small boat landings at Alaqua Point are not widespread or significant enough to affect the Gulf sturgeon through habitat alteration.

<u>All other locations</u> – There are no potential impacts to Gulf sturgeon habitat from small boat landings at Santa Rosa Sound, Wynnhaven Beach, Hammock Point (D-84), White Point, or East Bay.

As a result, activities associated with small boat landings for ARG/MEU training activities are anticipated to have no effect on Gulf sturgeon individuals or populations

AAVs

<u>Wynnhaven Beach</u> – Gulf sturgeon are known to migrate through Santa Rosa Sound; however, there are no spawning sites, congregation sites, or relocation sites within the Sound. Also, sturgeon prefer depths of approximately 6.5 to 13 feet. Sandy, muddy substrate may be affected by AAVs moving between Santa Rosa Island and Wynnhaven Beach. The area affected would be above the mean low tide four-foot bathymetry line (maximum depth of AAVs) to the shoreline. Figure A-45 shows the shaded area from the 6-foot bathymetry line to shore. Due to the area affected (4-foot depth to shore) existing outside of their primary habitat (6.5 to 13 feet), migratory movement only in the sound, and small impact area, impacts to the Gulf sturgeon through habitat alteration are not anticipated.

As a result, activities associated with AAV landings from ARG/MEU activities are anticipated to have no effect on Gulf sturgeon individuals or populations.

Amphibious Landing Avoidance and Minimization Procedures

Only established boat landings along the Yellow River would be utilized. Bottom scarring from AAV use would be minimized and seagrass beds would be avoided to the extent practicable.

Marine Mammals

Protected marine mammals would not experience negative effects from MEU training activities in Eglin waters. Manatee occur infrequently in the north Florida panhandle and would not be affected. Bottlenose dolphin density estimates derived from aerial surveys during the GulfCet II surveys for the offshore area are 0.31 animals per square mile. During the 10-day period of MEU exercises, there are expected to be 130 movements of LCACs between the Navy ships and shore (65 round trips), 78 movements by AAVs, and 42 movements by LCUs. LCACs are the largest vessels and their beam measurement (width) is used for conservative impact analyses. An LCAC is 47 feet in beam width, which is 0.0089 miles. The distance from Navy ship to shore is approximately 10 miles, so the total surface area potentially impacted per trip is 0.089 square miles. Multiplying this number by the total number of crossings results in a total water surface area of 22.25 square miles.

The maximum number of dolphins within the vessel transit area would be less than seven based on conservative estimates. Dolphins would easily avoid collision because the LCUs and AAVs move very slowly and the LCACs produce noise that would be detected some distance away and would be avoided as any other boat in the Gulf. Additionally, boat traffic would not increase significantly from normal operations in the Gulf. Except for the crossings from Santa Rosa Island to Wynnhaven Beach, Choctawhatchee Bay and Santa Rosa Sound boat traffic during MEU training activities would also not increase over normal operations. Bottlenose dolphins would likely avoid collision because the LCUs and AAVs move very slowly and the LCACs would be avoided the same as any other boat in the Bay or Sound. Due to the low number of ships, infrequency of movement in the Gulf of Mexico, Santa Rosa Sound, East Bay, and Choctawhatchee Bay, and no net increase in boat traffic, effects to marine mammals are not likely to occur.

MEU activities are not likely to adversely affect marine mammal individuals or populations.

Piping Plovers *(Charadrius melodus)*

The only documented sighting of a piping plover occurred on the north side of the island within designated critical habitat. This critical habitat area is more than three miles west of the LCAC/AAV crossover corridor. Therefore, amphibious craft landings at either the north or south shore within this corridor are not expected to pose a threat to critical habitat. However, due to the complexity of plover habitat usage patterns, the presence of piping plovers in landing areas cannot be ruled out. It is possible, though not likely, those amphibious craft landings may cause direct physical impact to an individual plover. It is more likely that amphibious craft landings would only serve to flush the bird from the landing area, possibly causing stress and extra caloric expenditure. The disturbance generated by sustained amphibious landing operations would be sufficient to keep piping plovers from foraging in the landing area during the course of the operation. During this time, displaced plovers may simply move on to undisturbed foraging areas.

Because the risk of direct physical impact is slight and indirect disturbance would be temporary and localized in nature, amphibious craft landings on SRI are not likely to adversely affect the wintering piping plover population.

Pine Barrens Tree Frog (*Hyla andersonii*),

Based on habitat analysis, there is the potential for the presence of the tree frog near locations utilized for amphibious landing activities (along the Yellow River and shallow areas of Choctawhatchee Bay). However, there is no confirmed presence of the tree frog at the specific locations of MEU activity. If present, the tree frog may potentially experience minor disturbances from noise and human presence along the Yellow River associated with amphibious landing activities. However, these disturbances would not result in significant impacts in terms of adversely affecting population viability or sustainability, as these activities would take place at established boat landing sites already used for similar activities.

4.11.1.2 Impacts from Ground Movement

Potential affected species from Ground Movement include the piping plover, Florida perforate lichen, sea turtles (nesting), bald eagle, flatwoods salamander, Okaloosa darter, gopher tortoise, bog frog, and shorebirds. Potential direct impacts to the flatwoods salamander, RCW, indigo snake, bog frog, gopher tortoise and burrowing owl would occur while indirect effects (i.e., erosion from tracked vehicle use) would potentially affect Okaloosa darters.

Piping Plovers *(Charadrius melodus)*

LCACs, AAVs, M1A1 tanks, bulldozers/earthmovers, and various wheeled vehicles are expected to operate within designated vehicle movement corridors and on established roads. Troop movements can occur anywhere within the designated troop movement area. Figure A-39, Appendix A, shows vehicular and troop movement corridors on SRI. The possible impact of each vehicle type is addressed individually below. A summary of the effects of ground movement and detailed recommendations for avoidance and minimization measures will follow.

LCACs may cross SRI within the crossover corridor west of A-13B as many as 134 times during the course of the 10-day ARG/MEU training cycle to transport weapons systems, equipment, cargo, and personnel from ship to shore across the barrier island. AAVs would cross the island at the A-13B corridor a total of 52 times. These vehicles would also cross from the beachfront to the road within the A-11A corridor a total of 26 times. A maximum of 13 AAVs could cross SRI during any single mission activity. During the course of the 10-day ARG/MEU training cycle, a total of four M1A1 tanks may be transported to SRI via LCU during daytime operations. Tanks would move from landing craft, across approximately 575 feet of beachfront, through a 100-yard corridor to the road at test site A-10 (Appendix A, Figure A-39) where they would be loaded onto trucks and transported inland. Tanks may also return to landing craft using this same route during the MEU withdrawal, bringing the total number of south shore tank crossings at A-10 to eight.

It is unlikely that bulldozers and/or earthmovers would be needed for activities on SRI. However, it is possible that sand escarpments along the shoreline within the three designated access/crossover corridors would need to be removed to make the landing of amphibious

vehicles at these sites possible. If bulldozers/earthmovers were used on the beachfront in this manner, they would be used for only a limited period of time during daylight hours. Various wheeled vehicles, including HMMWVs, seven-ton trucks, M-89 towed howitzers, and fuel trucks may operate on SRI at any time during the 10-day ARG/MEU action. Movement of these vehicles would be limited for the most part to daytime operations on established roads.

Troop movement may occur during the day or night anywhere east of the western boundary of INBS zone 9 and west of the eastern boundary of zone 18. This includes possible troop movement in or near possible piping plover foraging areas (sand/mud flats) on the north shore of the island. A maximum of 200 troops would move on the island at any one time during the MEU exercise. Movements are expected to be relatively short in duration, as troops would only be moving through the area to inland objectives and are not expected to bivouac on the island. A total of 600 troops may use the island during the entire 10-day period. Although large-scale troop movements have the potential to impact more areas in a greater variety of habitat types than localized vehicle use, the impacts are expected to be relatively slight. Troop movement should be less disturbing to piping plovers than vehicular movements. Plovers may be flushed from a movement area only to return after troops have moved through. Unlike vehicular movement, there is no risk of direct physical impact to plovers from troop movement. However, concentrated troop movement should be limited to areas outside of fragile foraging habitat (mud/sand flats) on the north shore of the island.

As stated earlier, one study suggests that wintering plovers spend as much as 76 percent of their time foraging (Johnson and Baldassarre, 1988). Because of this, piping plovers can be expected to use dune areas less often than foraging habitat, further decreasing the already slight risk of impact to plovers during inland vehicle operations. However, given the complexity of plover habitat usage patterns discussed above, the presence of piping plovers in inland areas during ground movement exercises cannot be ruled out. It is possible, though very unlikely, that ground movement operations in the designated movement corridors may cause direct physical impact to an individual plover. It is more likely that ground movement activities would only flush the bird, causing stress and extra caloric expenditure. Displaced plovers may simply move on to undisturbed foraging areas during ground movement activities.

The risk of direct physical impact during ground movements is slight, and indirect disturbance would be temporary and localized in nature. Ground movement activities on SRI are not likely to adversely affect the wintering piping plover population.

Bald Eagle (*Haliaeetus leucocephalus*)

A bald eagle nest occurs on the Eglin Reservation near TA A-22 on Eglin's main base. The nest is located approximately 170 feet from the shore of Choctawhatchee Bay. LCACs landing at TA A-22 during ARG/MEU activities would remain at least 1,500 feet from the nest (i.e. about 1,300 feet from shore) to comply with Bald Eagle Management Guidelines established by the U.S. Fish and Wildlife Service (USFWS, 1987). As a result, ARG/MEU readiness training would have no effect on bald eagles.

Flatwoods Salamander (*Ambystoma cingulatum*)

During MEU operations, vehicles, troops, and equipment would be transported through areas with potential and confirmed flatwoods salamander habitat. Because many of the areas identified as potential habitat were based on very preliminary analysis of GIS data and have not been verified, these areas are not currently considered to have a high likelihood of actually supporting flatwoods salamander populations, but are mentioned here as areas to avoid whenever possible. Potential flatwoods salamander habitat can be found inland from the landing areas at Hurlburt Field, East Bay Point, A-22, White Point, Alaqua Point, and Hammock Point (D-84) (Figures A-40 through A-47). Potential flatwoods salamander habitat is also scattered in numerous interstitial areas of Eglin, including concentrations along the East Bay River, Yellow River, northeast of Hurlburt Field, and along Choctawhatchee Bay.

Most of the confirmed flatwoods salamander habitat on Eglin Air Force Base and Hurlburt Field is concentrated south of the East Bay River. Movements from Wynnhaven Point and Hurlburt Field will traverse confirmed flatwoods salamander habitat. From the landing at Wynnhaven Point, resources would be moved inland to objective areas north on Range Road (RR) 259, then west on RR 668, then north on RR 253. This route crosses through confirmed flatwoods salamander habitat (Figure A-40). From the landing at Hurlburt Field, resources would be moved inland via the main entrance to Hurlburt, then west on Range Road 666 and north on RR 253, both of which cross through confirmed flatwoods salamander habitat (Figure A-40). There are also confirmed flatwoods salamander breeding wetlands located to the northwest of Wynnhaven Point along the East Bay River and northeast of Hurlburt Field.

Troop Impacts

Ground troops coming ashore at Wynnhaven Point, Hurlburt Field, East Bay Point, Yellow River, Hammock Point (D-84), Alaqua Point, and White Point would be moving inland through either confirmed or potential flatwoods salamander habitat. The only area where troops would be moving through confirmed flatwoods salamander habitat is south of the East Bay River, where they will remain on established roads. During the larger operations (MEU landing and withdrawal, small boat raid, mechanized raid wet), a maximum of 200 foot troops could move through any one of these areas at any given time. Heavy foot traffic by troops would have the potential to impact flatwoods salamander habitat by degrading water quality and altering hydrology. During R&S operations (potentially occurring at all beach landing sites except Hurlburt Field), four- to five-man teams would come ashore at established boat landings and move inland for reconnaissance. This may involve movement through interstitial areas that contain potential flatwoods salamander habitat. However, if troops remain on established roads near identified flatwoods salamander habitat constraint areas, foot traffic associated with MEU training activities is not anticipated to impact the salamander.

As a result, activities associated with ground troop movement from MEU activities are anticipated to not likely adversely affect flatwoods salamander individuals or populations provided that avoidance and minimization procedures are followed.

Wheeled Vehicle Impacts

The main areas of concern for wheeled vehicle use near flatwoods salamander habitat are Wynnhaven Point, Hurlburt Field, East Bay Point, Hammock Point (D-84), Alaqua Point, and White Point. Wheeled vehicles would be offloaded at these beach landing sites, then transit inland to objective sites. During transit to objective sites, vehicles would move through areas with both confirmed and potential flatwoods salamander habitat. Wheeled vehicles have the potential to impact flatwoods salamander ponds by altering hydrology and degrading water quality. However, vehicles would be restricted to established roads near salamander habitat and would not infringe upon buffer areas.

As a result, activities associated with wheeled vehicle use from MEU activities are anticipated to have no effect on flatwoods salamander individuals or populations provided that avoidance and minimization procedures are followed.

Tracked Vehicle Impacts

The only area where tracked vehicles (tanks, AAVs) would be moving in proximity to flatwoods salamander habitat is on Range Roads 259, 668, and 253 between Wynnhaven Point and the East Bay River during the MEU Landing and Withdrawal. Currently the portion of Range Road 259 between HWY 98 and Range Road 668 (1.5 miles) is paved with asphalt, which cannot support tracked vehicle traffic. Along this section of RR 259, there are three confirmed flatwoods salamander breeding wetlands. On the west side of the road, there are ponds within 62 feet and 108 feet of the road, and on the east side a pond is located 433 feet from the road (Figure A-40). Primary buffer habitat (538 feet) overlaps with the existing road for all three ponds.

Site designs have not been finalized at this time, but plans are for a tank trail to be built adjacent to the section of asphalt that passes through the flatwoods salamander habitat on the east side, with the existing asphalt left in place for use by wheeled vehicles. Widening along certain sections of RR 259 would be required because a minimum width of 15 feet of non-asphalted surface is required for the tracked vehicles. Figure A-40 shows the proposed road improvements for this area in relation to confirmed flatwoods salamander breeding wetlands and the buffers around those ponds.

A field evaluation by EMSN and SAIC staff was made of the quality and quantity of primary flatwoods salamander buffer habitat that would be impacted by the construction of a tank trail on the east side of RR 259. Most of the 15-foot swath east of RR 259 (width required for tank trail) is already cleared road shoulder, but approximately 7,920 square feet of poor to moderate quality buffer habitat and 10,560 square feet of good quality buffer habitat would need to be cleared for the tank trail. The good quality buffer habitat is located just north of the second section of RR 259 that will be concreted and is across the road from the large southernmost salamander breeding pond on the west side of RR 259. No salamander ponds would be directly impacted by the tank trail.

The major short- and long-term impacts from a tank trail would include potential erosion/sedimentation from construction and maintenance of the trail, mounding of dirt such that salamanders could not cross the trail, and hydrological changes to breeding wetlands. There

would be potential short-term impacts from construction associated with erosion/sedimentation, but BMPs outlined in the Range Road Maintenance PEA would minimize those impacts.

Road improvements associated with tracked vehicle use on RR 259 from MEU activities are likely to adversely affect flatwoods salamander habitat. Avoidance and minimization procedures would help to minimize the potential for impacts.

Ground Movement Avoidance and Minimization Procedures

Avoidance and minimization procedures that would be employed to minimize impacts to the flatwoods salamander from ground movement associated with MEU training include:

- Restrict activities in isolated wetlands and within good condition primary buffers.
- When it is impossible to avoid flatwoods salamander habitat, confine impacts to poor buffer habitat versus high quality buffer habitat.
- Avoid mounding of materials on sides of the road.
- Put RR 259 tank trail on east side of the road near flatwoods salamander habitat to minimize impacts.
- For road improvement/construction activities along RR 259, RR 668, RR 666, and RR 253, employ BMPs outlined in Range Road Maintenance Handbook.
- South of the East Bay River, restrict large troop movements to established road surfaces.
- Pyrotechnics use will follow Eglin's Wildfire Specific Action Guide Restrictions.

Okaloosa darter (*Etheostoma okaloosae*)

Excess sedimentation is the major threat to Okaloosa darter habitat; therefore, minimization of erosion in Okaloosa darter watersheds is extremely important. Okaloosa darter watersheds are contained within portions of these test areas/auxiliary fields where MEU training operations are proposed: TA C-52, TA C-72, TA C-53, TA C-5, and Auxiliary Fields 1, 2, 3, 5, and 8 (Figures A-20 and A-38). Although specific movement corridors are unknown at this time, troops and equipment would also potentially be moving in interstitial areas that contain Okaloosa darter streams.

Troop Impacts

Foot traffic, both on and off established roads, has the potential to cause erosion problems. However, troop movements through Okaloosa darter streams would be restricted.

As a result, activities associated with troop ground movement from MEU activities are anticipated to have no effect on Okaloosa darter individuals or populations, provided that avoidance and minimization procedures are followed.

Wheeled and Tracked Vehicle Impacts

Wheeled and tracked vehicles have the potential to increase erosion rates if driven in inappropriate areas. However, wheeled and tracked vehicles would be restricted to established roadways, trails, and bridges throughout the interstitial area and on test areas when near Okaloosa darter streams.

As a result, activities associated with wheeled and tracked vehicle use from MEU activities are anticipated to have no effect on Okaloosa darter individuals or populations, provided that avoidance and minimization procedures are followed.

Ground Movement Avoidance and Minimization Procedures

Avoidance and minimization procedures that would be employed to minimize impacts to the Okaloosa darter from ground movement associated with MEU training include:

- Vehicles and troops use established roads, trails, and bridges near Okaloosa darter streams.
- Vehicles and troops avoid activities on steep slopes near Okaloosa darter streams and in newly restored areas adjacent to Okaloosa darter streams.
- Ground disturbance is minimized near Okaloosa darter streams.
- Operations are conducted in accordance with guidelines in the Range Road Maintenance PEA and the Test Area Maintenance PEA.

Red-cockaded Woodpecker *(Picoides borealis)*

Insertion of forward command element and insertion of R&S teams involve small groups of personnel whose goal it is to remain undetected; thus, movements are stealthy and quiet and noise effects on RCWs are not expected. Wheeled and tracked vehicle movement, foot traffic within the Eglin Military Complex from wet and dry mechanical raids, and MEU landings (e.g., as vehicle proceed toward an objective) would potentially create noise and disturbance that could affect RCWs. Guidelines presented in the U.S. Army Management Plan for RCWs and corresponding USFWS Biological Opinion would minimize potential noise and disturbance from Ground Movement activities on RCWs (U.S. Army, 1996; USFWS, 1996). An important aspect of the Biological Opinion is the recognition of a 200-foot buffer zone around individual RCW cavity trees and the concurrence regarding the types of activities allowed within the 200-foot buffer that would not result in impacts to RCWs. Certain activities are not allowed; however, the USFWS agreed with the U.S. Army that transient foot traffic within 200 feet of RCW cavity trees would have no effect on RCWs, nor would transient vehicle traffic that stayed on existing trails or roads (U.S. Army, 1996; USFWS, 1996). Transient activities involve maneuver type training, have low-intensity human activity, and a short-term (less than 2-hour) human presence (U.S. Army 1996). Activities that are not allowed within the 200-foot buffer zone include bivouacking and establishing command posts and excavating/digging. Figure 2-1 illustrates proposed wheeled and tracked vehicle routes.

Improvements to RR 259 would be required to accommodate vehicles. In order to provide ample clearance for MEU vehicles, Range Road 259 would require widening to a total cleared width of 32 feet. The removal of long leaf and slash pine trees from along the edge of the road would be required to support this width. Approximately 3.2 miles of RR 259 that would be widened is located within RCW foraging habitat. Figure A-74 shows the stretch of road being evaluated and the locations of the clusters that would be affected. Eglin Natural Resource Branch personnel conducted a survey on February 15–16, 2003, of all long leaf and slash pine trees greater than 10 inches dbh that are within red-cockaded woodpecker foraging areas and that fall within the 32-foot width. Seven clusters are impacted by tree removals associated with widening RR 259 as shown in Table 4-33. For each cluster affected, the current foraging habitat has been calculated in terms of total number of trees with at least 10-inch dbh and also the current basal area. The basal area has also been calculated with consideration given to 15 percent sharing of trees for foraging among adjacent clusters. The total number of trees to be removed has been tabulated based upon the recent survey and the percent loss of trees for each cluster.

Table 4-33. Potential Tree Removals Associated with Widening of RR259

Cluster ID	Current Basal Area (ft^2)	Current BA (With 15% sharing)	Current Number of Trees (10 inch dbh or greater)	Number of trees to be removed (10 inch dbh or greater)	% Loss of Trees
500D	5,436	6,263	4,708	43	0.9
500F	5,515	7,521	4,773	38	0.7
500H	7,940	9,958	6,927	63	0.9
500I	7,944	10,138	6,938	45	0.6
500R	6,920	9,114	5,691	25	0.4
500Q	6,693	8,922	5,505	31	0.6
704F1	7,942	10,295	6,525	11	0.2
Total	**48,390**	**62,211**	**41,067**	**256**	**0.6 (avg)**

Based on these calculations, the percent loss to an individual cluster from road widening ranges from a 0.2 to 0.9 percent. Therefore, all clusters would retain at least 99 percent of their current forage capacity if this project were implemented. The road-widening project would be coordinated with Natural Resources personnel, and no active cavity trees would be removed because the road widening would be adjusted so that the active trees can be avoided. There are currently six active cavity trees that are within 100 feet of the existing road. The habitat quality for all the impacted clusters is very high, with an average burn frequency of every three years over the past ten years. Because the quality of habitat is very good, no active trees would be removed, and the total loss of foraging habitat for each cluster is less than 1 percent, the Natural Resources Branch believes that implementing this road-widening project and removing the trees as identified is not likely to adversely affect the red-cockaded woodpecker.

Ground movement activities are not likely to adversely affect the RCW provided these activities are transient in nature and that no digging/excavating or bivouacking near the cavity trees occurs.

Florida Perforate Lichen (*Cladonia perforata*)

During the course of the Proposed Action, several types of tracked and wheeled vehicles would operate on existing roads and within designated movement corridors on SRI. However these movement corridors are situated a safe distance away from perforate lichen populations and are not expected to pose a threat. Substantial troop movement could occur less than one mile west of the easternmost lichen population. Figure A-39 shows the locations of MEU vehicle and troop movement corridors in relation lichen populations.

Vehicle Impacts

LCACs, AAVs, M1A1 tanks, bulldozers/earthmovers, various wheeled vehicles, and troops are expected to operate within designated vehicle movement corridors and on established roads. Troop movements can occur anywhere within the designated troop movement area. Figure A-39 shows vehicular and troop movement corridors on SRI. The operation of LCACs, AAVs, tanks, bulldozers/earthmovers, and wheeled vehicles would occur on established roads or within designated off-road access/crossing corridors, and these roads and corridors are situated a safe distance away from lichen populations.

Ground movement involving vehicles is not likely to adversely affect the Florida perforate lichen population on SRI.

Troop Impacts

Troop movement may occur anywhere east of the western boundary of INBS zone 9 and west of the eastern boundary of zone 18. A maximum of 200 troops would move on the island at any one time during the MEU exercise. A total of 600 troops may use the island during the entire 10-day period. Under the Proposed Action, substantial troop movement could occur less in close proximity to the westernmost lichen population (Figure A-39). Therefore, lichen populations and surrounding suitable habitat should be fenced and flagged using infrared tape with a 10-foot buffer to prevent inadvertent trampling of lichen mats.

With adherence to avoidance and minimization procedures as identified below, troop movement is not likely to adversely affect Florida perforate lichen populations on SRI.

Avoidance and Minimization Measures

To ensure that proposed actions do not impact reintroduced populations of *Cladonia perforata* on SRI, the following measures should be followed.

- Lichen populations and surrounding suitable habitat would be fenced and flagged using infrared tape with a 10-foot buffer to prevent inadvertent trampling of lichen mats.
- Monitoring would be conducted immediately before and after the first cycle of MEU operations to ensure no effect.
- If populations were unaffected after the first MEU cycle, annual population monitoring would continue as scheduled.

- In the event that monitoring shows an expansion of cover, the fenced area should be expanded accordingly.

Eastern Indigo Snake (*Drymarchon corais couperi*)

The only real potential impact to the eastern indigo snake is from direct physical impacts associated with ground movement on the Eglin Mainland Reservation. Incidental contact with troops on foot and wheeled and tracked vehicles could result in trampling or crushing of individuals. However, this occurrence is unlikely, as the snake would most likely move away from the area if it sensed a general disturbance in its vicinity.

With adherence to avoidance and minimization procedures as outline below, MEU activities are not likely to adversely affect the eastern indigo snake.

Ground Movement Avoidance and Minimization Procedures

- MEU personnel, as part of an educational overview of all federally listed species on Eglin, would be provided a description of the eastern indigo snake, its habits, and protection under federal law.
- MEU personnel would receive instructions not to injure, harm, or kill this species.
- Should an indigo snake be sighted, MEU personnel would be directed to cease any activities and allow the eastern indigo snake sufficient time to move away from the site on its own before resuming such activities.
- To the extent possible, gopher tortoise burrows would be avoided.

Bog Frog (*Rana okaloosae*)

During ARG/MEU readiness training exercises, small boat raids involving Zodiac boats may be conducted along the Yellow River. Boat raid landings would only occur at established boat ramps along the main river and are not expected to impact smaller tributaries that may be inhabited by this rare frog. Small boat operations are not expected to affect water quality in the Yellow River or increase current levels of erosion (see Sections 4.7 and 4.9). Because activities would be sited away from bog frog habitat, ARG/MEU readiness training would have no effect on bog frog populations.

Gopher Tortoise

During MEU operations on Eglin, mechanized raid and/or live fire maneuvers may take place on test areas in close proximity to gopher tortoise burrows. While it is possible that vehicles could crush an individual tortoise, burrow, or egg clutch during these exercises, this risk is minimized by the fact that vehicle activity will be limited and confined for the most part to the established roads. A thorough analysis of the impact of current mission activity to gopher tortoise populations was analyzed in the TA B-70 Programmatic Environmental Analysis (USAF, 1998). Gopher tortoise densities were calculated to be approximately 8 active burrows for every 100 acres of test area. These low densities make it improbable that munitions expended during MEU operations will directly impact a tortoise, burrow, or egg clutch. MEU exercises are not expected to pose an additional threat beyond those discussed in the TA B-70 PEA.

Florida Burrowing Owl (*Athene cunicularia floridana*)

During MEU operations on Eglin, mechanized raid and/or live fire maneuvers may take place on TA B-70. While it is possible that vehicles could crush an individual owl or burrow during these exercises, this risk is minimized by the fact that vehicle activity would be limited and confined for the most part to the established roads. The threat of current mission activity to burrowing owl populations was analyzed in the TA B-70 Programmatic Environmental Analysis (U.S. Air Force, 1998f). Because Eglin's burrowing owl population is currently stable under the existing level of mission activity on TA B70, MEU exercises are not expected to pose an additional threat.

Santa Rosa Beach Mouse (*Peromyscus polionotus leucocephalus*)

Because the primary foraging and sheltering habitat of the state-listed Santa Rosa beach mouse is within the primary, secondary, and tertiary sand dunes of Santa Rosa Island, beach mice may be impacted by MEU-related vehicular and troop movements. Hovercraft and various tracked and wheeled vehicles are expected to operate in designated vehicle movement corridors at test sites A13B, A11A, and A10, and substantial troop movements may occur anywhere within the designated troop movement corridor. A map of these corridors is available in Appendix A, Figure A-39. During preliminary site visits, beach mouse tracks were documented within vehicular movement corridors (SAIC, 2003). Vehicles and troops are expected to avoid dunes that are greater than 5 feet high. This measure would reduce potential impacts to beach mice or their burrows. Avoiding dunes would also reduce impacts to the dune vegetation, which serves as a food source for this species. EAFB Natural Resources branch conducts quarterly track count surveys in the vicinity of the proposed action area. Data from these surveys are expected to indicate any substantial change in beach mouse populations on SRI.

Shorebirds (*Sterna antillarum, Charadrius alexandrinus, Rynchops niger*)

General descriptions of state-listed (but not federally listed) shorebird species (least terns, southeastern snowy plovers, and black skimmers) and their nesting areas are available in the *Affected Environment* section above. The closest documented occurrence of least tern and black skimmer nesting is situated approximately 1.5 miles west of the proposed action area and would not be impacted. However, snowy plovers are solitary nesters and could nest anywhere along the rack line or other suitable habitat along the beach, which includes proposed ARG/MEU training locations. Thus, while nesting colonies or individual nests of these three species have not been documented within the proposed MEU action area, they have the potential to occur within the MEU training area. As a result, any activity that occurs on Santa Rosa Island within the breeding seasons of these birds has the potential to impact reproductive success.

Wading Birds (*Egretta thula, Egretta caerula, Egretta tricolor, Eudocimus albus)*

State listed wading birds such as the snowy egret, little blue heron, tricolored heron, and white ibis, which are designated as species of special concern by the Florida Fish and Wildlife Conservation Commission, would be minimally impacted primarily from temporary displacement from foraging areas, such as the wetland areas within the A-13 crossover corridor, or along shorelines of saltwater and freshwater water bodies. A breeding area for several wading bird species is documented to occur along the west shore of East Pass on Santa Rosa Island, but

would not be affected as this area is not part of the proposed action. Given the temporary duration of the proposed action and the avoidance of key breeding sites, the impacts to state listed wading bird species would not be significant.

Southeastern American Kestrel (*Falco sparverius paulus*)

No site verification data of inactive/abandoned RCW nest occupancy by kestrels were available; however, field personnel have sighted the species throughout Eglin. As a result, the potential for impacts does exist if kestrels are present near ground movement areas. The main potential for impact from ground movement is associated with noise disturbance to kestrels during nesting and foraging resulting from troop movements through interstitial areas. Vehicles would normally remain on established roads and tracks.

Nest flushing and abandonment induced by aerial and ground-based noise disturbance during the nesting season have been shown to adversely impact the nesting success of some birds (Hohman, 1986). Studies of several species of raptors and other birds reported increased nest abandonment when subjected to ground-based noise disturbance (Platt, 1977; Anderson et al., 1989; Grubb and King, 1991; Delaney et al., 1999). However, there is limited data that ***quantifies*** the noise disturbance dose – behavioral response relationship or identifies noise response thresholds for wildlife species (Pater et al., 1998).

Findings by Black et al. (1984) and Gladwin et al. (1988) suggest that nesting and reproduction success may be more heavily dependent on factors associated with location, climate, and provisions of habitat than noise. In addition, research by Busnel (1978) suggests that animals react with startle behaviors to noise, but over time this reaction may subside.

Avian species have also been documented to exhibit resilience and adaptation in becoming accustomed to various types and frequencies of aerial and ground-based noise events with only slight or insignificant decreases in nesting success and productivity (Platt, 1977; Anderson et al., 1989; Ellis et al., 1991). A cluster of two pairs of burrowing owls was reported to be nesting at the Imesan Airport north of Jacksonville in Jacksonville County in 1975, and in 1976 a cluster was found along Interstate 10 near Falmouth in Suwannee County. An increasing portion of the Florida burrowing owl population is becoming dependent on the artificial habitats created by human activities and is becoming increasingly adapted to the noise and disturbance associated with industry and development (Kale, 1978).

Ground-based noise events have been shown to have a greater potential impact on birds than aerial disturbance. Grubb and King (1991) identified ground-based noise as having a higher response frequency and severity in Arizona bald eagles (*Haliaeetus leucocephalus*) than aerial disturbances. Delaney et al. (1999) also found the Mexican spotted owl (*Strix occidentalis lucida*) had an elevated flush response to ground-based noise.

The kestrels are quite tolerant of human activity around their nests. They are frequently flushed or caught at the nest without desertion. In Ohio, kestrels use centers of human activity more than other raptors (Fischer et al., 1984). Given these factors, it is reasonable to assume that troop movements through interstitial areas may disturb the species on an intermittent, temporary basis. The fact that this training would only take place twice a year for ten days also serves to lessen the potential impacts. In fact, hunting and forestry activities near kestrel trees, which the kestrel

has apparently become accustomed to, occur on an ongoing, regular basis. As a result, no significant impacts to the kestrel would occur from the Proposed Action.

Dusky Gopher Frog (*Rana capito sevosa*)

Of main concern regarding the gopher frog is the potential to impact breeding sites. Troops and vehicles will avoid adversely impacting wetland and surface water areas, thereby reducing the potential for impacts to the gopher frog (see Wetlands Section). Incidental trampling may occur from foot traffic and/or vehicle use. However, the chances of this occurring are minimal (the species would likely move if it sensed a large movement nearby) and not considered significant in terms of impacting population viability or sustainability.

Pine Barrens Tree Frog (*Hyla andersonii*)

Some minor disturbances from ground movement near streams may occur. However, these disturbances would be intermittent and temporary, with no significant impacts expected to occur. Also, incidental trampling may occur from foot traffic and/or vehicle use. Nonetheless, the chances of this occurring are minimal (the species would likely move if it sensed a large movement nearby) and not considered significant in terms of impacting population viability or sustainability.

Sherman's Fox Squirrel (*Sciurus niger shermani*)

The main potential for adverse impacts to the squirrel is associated with incidental strike from a moving vehicle. However, the chances of this occurring are minimal (the species would likely move if it sensed a large movement nearby) and not considered significant in terms of impacting population viability or sustainability.

4.11.1.3 Impacts from Aviation Operations

Red-cockaded Woodpecker *(Picoides borealis)*

Noise from these activities would be centered around established airfields and throughout the airspace, generally at altitudes greater than 500 feet. Noise from helicopter raids would be concentrated at designated landing zones and over designated flight routes. There would be no effect on RCWs.

Southeastern American Kestrel (*Falco sparverius* paulus)

As described above, noise from these activities would be centered around established airfields and throughout the airspace, generally at altitudes greater than 500 feet. Noise from helicopter raids would be concentrated at designated landing zones and over designated flight routes. These activities would not adversely impact kestrel foraging or breeding activities.

Piping Plovers *(Charadrius melodus)*

Aviation operations would potentially affect piping plovers. Helicopter and fixed-wing aircraft may provide air support and surveillance for any training activity conducted on SRI; however, due to noise concerns for populated areas just across Santa Rosa Sound, all flights over the island would be no lower than an altitude of 500 feet. Due to the height of island overflights, no impact to piping plovers is expected from aviation operations over SRI.

Helicopter landings on SRI are unlikely due to the fact that rudder wash can cause dangerous whiteout conditions in sandy environments. However, during nighttime R&S insertions, troops may repel onto one of two designated helicopter landing zones on the island from Huey or CH-46 helicopters a maximum of five times over the course of the 10-day ARG/MEU exercise. During these troop insertions, helicopters may hover at an altitude of about 20 to 50 feet for a maximum of five minutes while troops deploy. All helicopter landings and low-altitude troop insertions would occur beyond the primary dune line with no effect to possible plover foraging areas near the shore. In the unlikely event that a piping plover is found in or near the landing/troop insertion area, the bird would be temporarily flushed from the area. No direct physical impact from helicopter operations is expected.

Because insertions of this manner would be brief and localized behind the primary dune line, aviation operations over SRI is not likely to adversely affect the wintering piping plover population.

4.11.1.4 Impacts from Munitions Use

Piping Plover (Charadrius melodus)

Munitions use on Santa Rosa Island would potentially affect piping plover. Munitions use on SRI would be confined to small arms blank firing during direct actions, small boat raids, and the mechanized raid wet. These actions may occur at test sites A-15, A-11A, and/or A-12. In the unlikely event that a piping plover is found in or near these areas, noise associated with the firing of blank munitions can be expected to flush the bird from the landing area, possibly causing stress and extra caloric expenditure. During this time, displaced plovers may simply move on to undisturbed foraging areas nearby.

Firing of small arms blanks on SRI during the wintering season is not likely to adversely affect the wintering piping plover population on SRI.

Red-cockaded Woodpecker *(Picoides borealis)*

Noise from SACEX and live fire/maneuver activities would potentially affect RCWs. For the SACEX training event, 250 ground-based Marines would be deployed to or within a 10-mile radius of TA C-52N to call in live fire from aircraft to targets on TA C-52N. Spotters, forward observers, and forward air controllers would employ laser finders/designators in the impact area. Major weapon systems would include 60- and 81-millimeter mortars, and 155-millimeter Howitzers. Aircraft would be AH-1W and UH-1N helicopter gunships and AV-8B and F/A-18 fixed-wing aircraft.

Artillery is proposed to be fired from the Eglin interstitial areas and test areas as far as 10 miles out from the center of TA C-52N, and aircraft would deliver live munitions to targets on this test area. The largest artillery, the 155 mm towed Howitzer would be fired from Test Area C-72, about eight miles away. The 60 mm and 81 mm mortars would be fired from less than five miles from the center of TA C-52N.

The firing duration would be from noon to midnight each day over a 72-hour period and would occur twice a year.

Bomb and artillery noise impacts to RCWs were assessed. The maximum safe exposure level for humans without ear protection is 140 dBP, a threshold that is based on exposure to 100 140-dBP noise events over a 24-hour period (U.S. Air Force, 1996). This conservative but reasonable threshold should suffice for estimating potential noise impacts to RCWs in the absence of any specific threshold for that species.

Noise from bombs and artillery was modeled using the Noise Assessment and Prediction Model (NAPS) developed by Dr. Jim Luers of the Dayton Research Institute (Dayton Research Institute, 1990). The model estimates the peak noise intensity, expressed as pressure decibels or dBP, at ground level in all directions surrounding a blast source. The TNT-equivalent net explosive weight and desired weather conditions are input into the model and noise in decibels by distance from the noise source are generated in the output. Appendix H lists expendables and net explosive weights for ARG/MEU training. A favorable (meaning not conducive to propagating noise) weather scenario of no winds and no temperature inversions was input into the model for the Mk-83 and for the artillery and mortar muzzle blasts. Winds and inversions have little effect on noise greater than 140 dBP; thus other scenarios were not considered. Artillery shell detonations, which were not analyzed, would occur on the test area away from RCWs, whereas the firing of the artillery and, in particular, the smaller mortars (60 mm and 81 mm) could occur from off Test Area C-52N near RCWs. Thus, the propellant blast is the focus of the analysis for artillery noise.

Noise from Bombs

A total of 12 Mk-83s and 6 Mk-84s would be detonated on C-52N targets. Under favorable weather conditions of low winds and no temperature inversions, potentially harmful levels of noise (i.e. >140 dBP) from these bombs delivered onto targets at C-52N would not reach RCW cavity trees. Though winds and inversions can propagate noise levels beyond what would occur under favorable weather conditions, the levels of noise that are of greatest concern (i.e., >140 dBP) expand outward from the point of detonation at a rate of speed that essentially negates wind effects. The nearest cavity tree is located over 4,000 feet away and would be exposed to between 130 and 125 dBP from an Mk-83 detonation. Noise of 140dB from Mk-84 detonations would extend out to about 1,000 feet. Typically, the number of annual detonations on TA C-52N range between 100 and 300 bombs with a net explosive weight 200 pounds or greater. Thus, it is unlikely that RCWs would experience any new noise from the Proposed Action outside of the norm for this area.

Noise from Artillery

Noise from artillery would be produced from the propellant charge or muzzle blast of the mortars. The shells would detonate on or near targets on TA C-52N and should not affect RCWs located just outside the boundaries of TA C-52N. The reason is that the explosion produced by the shell is relatively minor (compared to the previously analyzed Mk-83, which had no effect), involving at most about 20 pounds of explosive. Adverse noise from artillery shells exploding on TA C-52N would not reach RCW cavity trees.

Noise from the 155-mm propellant just over 140 dBP would extend outward to around 730 feet. Effects to RCWs near TA C-72 are unlikely since this noise level would most likely be confined to the test area boundaries for most firing scenarios (i.e., along test area roads). RCWs are not located on the test area, but do occur just beyond the southeast boundary. Most of the roads on which the towed howitzer would travel (and be fired from) on TA C-72 are well within the interior of the test area. As a precaution, it is recommended that firing be conducted at least 1,000 feet from the southeast boundary. All other areas of TA C-72 would have no such constraints with respect to RCWs.

Noise from the 60 mm and 81 mm muzzle blasts would be produced by up to three pounds of propellant. Three pounds of explosive would send noise of about 140 dBP outward to a distance of roughly 500 feet. Since the 60 and 81 mm mortars would be fired from within five miles of TA C-52N, the number of active cavity tree clusters was examined with the aid of the Eglin AFB Geographic Information System. According to the GIS, there are 37 RCW cavity tree clusters that occupy less than 10 percent of the area within the five-mile firing radius, with ample space available to allow firing from several locations. Given the available area, there are many potential firing positions that would have no noise effects on RCWs. However, placement of the 60 mm and 81 mm mortars within 500 feet of active RCW cavity trees, particularly at night or during nesting season when the birds would be at their nests, may have some adverse effect. Thus, it is recommended that 60 and 81 mm mortars be fired at a distance greater than 500 feet from any active RCW cavity tree. For consistency with other Marine training locations, it is recommended that this buffer distance be set at 200 meters (656 feet) to agree with Camp LeJeune Range Control Standard Operating Procedures. This document states that no artillery or mortars are to be fired within 200 meters of an active RCW cavity tree (USMC, 2002).

Noise from Armored Vehicles

Groups of 135 Marines would operate on multiple ranges and conduct live fire on established live fire areas. This event includes fire and maneuver of the M1A1, AAV, LAV and HMMWV-mounted TOW missiles, heavy machine vehicles, and small arms. In the event that RCW trees occur on these established live-fire areas, the same stipulations previously identified in the Ground Movement and Munitions Use discussions would apply.

Noise from Munitions Use is not likely to adversely affect RCWs, provided the 200-meter buffer for artillery/mortar fire is observed.

Southeastern American Kestrel (*Falco sparverius paulus*)

Potential impacts from munitions use are mainly associated with noise. While there are no studies on the impact of munition noise on the kestrel, a recent study by Pater et al. (1998) investigated the impacts of military training noise on the red-cockaded woodpecker cluster populations located within Fort Stewart, Georgia, by direct observation of behavior responses and nesting success. Training noise sources included live gun fire (155, 120, and 25 mm), small arms live and blank fire (5.56, 7.62 and 9 mm and .50 caliber), artillery simulators, multiple launch rocket system (MLRS), and helicopter flights. The noise response criteria for the study was based on the immediate behavioral (alert, flush, recovery time, nest attentiveness, prey deliveries, and trips) response of individuals, effects on individual fitness (mortality or reduced nesting success), and effects to the cluster population. Noise levels were measured at the base of the RCW tree and in the tree cavity.

In a representative evaluation of the cluster of RCWs that experienced the loudest extent of noise, an adult RCW was flushed and returned to the nest after 6.25 minutes following the loudest blast and did not flush in response to subsequent blasts. During another testing period, the adult RCW was flushed in response to the 52nd blast in a 60-blast series and returned to the nest after 4.42 minutes. It was concluded that the measured levels of military training noise did not impact RCW productivity or nesting success and caused infrequent RCW flush responses. Data showed that there was a greater tolerance to gun noise than to the other military training activities evaluated.

Based on these findings, and using the RCW as a representative surrogate for impact analysis for the kestrel, it can be reasonably assumed that munitions use (e.g., use of blanks, small arms, mortars, etc.) will have no significant impacts to population viability or sustainability of the kestrel.

Dusky Gopher Frog (*Rana capito sevosa*)

Amphibians do not exhibit a well-developed acoustic startle response and are often regarded as nonsusceptible to noise impacts (U.S. Fish and Wildlife Service, 1988a). Additionally, gopher tortoise burrows are frequent habitats for the gopher frog, which affords a level of protection against the effects of some noise disturbance. There is the potential to entomb some species if noise overpressures cause burrow collapse; however, no data are available that correlates a relationship between noise overpressures and this phenomenon.

Pine Barrens Tree Frog (*Hyla andersonii*)

As stated previously, amphibians do not exhibit a well-developed acoustic startle response and are often regarded as nonsusceptible to noise impacts (U.S. Fish and Wildlife Service, 1988a). Any impacts from noise would likely be associated with a visual presence (i.e., nearby troops within visible distance). Additionally, any potential noise impact would be intermittent and temporary and would most likely result in a startle and movement response. This disturbance would not result in mortality of injury to the animal. As a result, no significant adverse impacts to tree frog population viability or sustainability are expected.

Sherman's Fox Squirrel (*Sciurus niger shermani*)

Any impacts from noise would likely be associated with a visual presence (i.e., nearby troops within visible distance). Additionally, any potential noise impact would be intermittent and temporary and would most likely result in a startle and movement response. This disturbance would not result in mortality of injury to the animal. As a result, no significant adverse impacts to fox squirrel population viability or sustainability are expected.

4.11.1.5 Impacts from Pyrotechnics

Red-cockaded Woodpeckers *(Picoides borealis)*

Use of smokes and obscurants would take place during most of the MEU exercises. Guidelines established by the USFWS indicate that the use of smokes and flares within 200 feet of RCW cavity trees would not adversely affect this species (U.S. Army, 1996; USFWS, 1996). Pyrotechnics use is expected to have no effect on RCWs.

Avoidance and Minimization Measures

Pyrotechnics use will follow Eglin's Wildfire Specific Action Guide Restrictions.

Piping Plover *(Charadrius melodus)*

Pyrotechnics would potentially affect the piping plover. Smokes, signal flares, and simulators may be used on SRI during the mechanized raid wet, small boat raid, MEU landing, and withdrawal. Unlike munitions, there is little noise associated with the use of smokes or flares. The use of these items during operations on SRI is not expected to add to the level of disturbance caused by the operation itself (see discussions of landings and ground movements below). However, the noise produced by use of simulators is comparable to that of small arms blanks firing as discussed above.

The proposed use of pyrotechnics on SRI is not likely to adversely affect wintering piping plover population on SRI.

State-listed Species

The main impact associated with pyrotechnic use is the potential for wildfire occurrence. As stated previously, many of the sensitive specie habitats on Eglin are fire dependent, and prescribed burning is used to enhance the habitat. On Eglin, once a wildfire is started, it can spread to adjacent forested buffer zones. The fires are either extinguished or allowed to burn under control if they may have any beneficial effects.

Using existing wildfire information from similar troop movement exercises at Ft. Stewart and Camp LeJeune that involve munitions and pyrotechnics, Eglin Natural Resources estimated the potential increase in wildfire starts from ARG/MEU exercises. Approximately 14 new wildfire starts per year may be expected from ARG/MEU training. A wildfire operational plan would be required to ensure adequate coordination between ARG/MEU participants and Eglin Natural Resources in the event of a wildfire; in addition, the observance of existing fire management

protocols will be enforced, and pyrotechnics and tracer use would be restricted on high fire index days. For ARG/MEU training, Eglin Natural Resources wildfire management personnel will be on hand to respond to any fires. Considering these factors, the potential for significant adverse impacts to sensitive species and their habitat associated with wildfires is minimal.

4.11.2 Alternative 1: Minimal Infrastructure Improvements

Under this alternative, sensitive species would be potentially less affected since some site improvements would not be implemented. No road improvements would occur; thus flatwood salamander habitat and RCW foraging habitat that would have been affected from road improvements under the Proposed Action would not be affected under this alternative. Potential effects from training activities would not change. All potential effects to Santa Rosa Island species would be the same under this alternative as the Proposed Action.

4.11.3 No Action Alternative

MEU training would not be conducted at Eglin Air Force Base. Therefore, no impacts would occur.

4.12 SENSITIVE HABITATS

Sensitive habitats include essential fish habitat (EFH) in estuarine and marine areas and high quality (i.e., Tier 1) plant communities and significant botanical sites that have high concentrations of rare plants. Wetlands are also a sensitive habitat and are discussed in Section 4.5. Amphibious landings would potentially affect EFH, while ground movement activities are potentially impactive to plant communities and significant botanical sites.

Except for ship transit, no activities would occur within any Marine Protected Areas (MPAs). In the study area, the nearest boundary of the closest MPA, the Desoto Canyon Closed Area, is more than 20 miles offshore and the area is designated as closed by NOAA Fisheries to certain methods of fishing. Therefore, ARG/MEU activities would not affect Marine Protected Areas and are not discussed further.

4.12.1 Proposed Action

4.12.1.1 Impacts from Amphibious Landing

Potential impacts from amphibious landing operations consist of the destruction or degradation of EFH, including emergent vegetation, seagrasses, oyster reefs, and artificial reefs. Vessels would move through *Sargassum*, but this contact would not significantly affect or reduce this habitat. Impacts could be caused by contact between the vessels and the sea floor. Contact could impact habitat quality either directly by physical disruption or indirectly by siltation.

Activities that may potentially result in such impacts are those that involve the use of LCACs, LCUs, and AAVs. Zodiac boats are not considered to have impacts to EFH because of these boats have a shallow draft and are powered by a water intake and propulsion system rather than a propeller. Of the vessels considered, the LCU has the deepest draft, which is seven feet. Mission activities that involve the use of one or more of these vehicles include the Amphibious

Landing Rehearsal, Mechanized Raid Wet, MEU Landing, and Withdrawal. These activities may occur at East Bay, Santa Rosa Island, Wynnhaven Beach, Destin Pass, White Point, and TA D-84. During activities that utilize AAVs and LCUs, EFH could potentially be impacted in areas with water depth less than seven feet. The map of resources shown in Figures A-43 through A-47, and A-65 through A-66, Appendix A, shows where these areas are located. The primary potential impact that could result from LCAC landings is damage to emergent vegetation.

East Bay

Because of the very shallow water depths approaching the shoreline, AAVs and LCUs would not be utilized at East Bay. LCACs would be the only amphibious vehicles employed. No emergent vegetation, seagrasses, or artificial reefs are present in the area. Some short-term increases in turbidity would be expected in shallow nearshore waters, but no sensitive habitats would be affected. Oyster reefs are present about 100 feet offshore but would not be affected by LCAC landings. Therefore, the proposed activities conducted at East Bay are not likely to adversely impact EFH.

Santa Rosa Island

LCACs, AAVs, and LCUs would be employed during activities on Santa Rosa Island. However, no emergent vegetation, seagrasses, or oyster reefs are present either along the potential Gulf landing sites or along the transit corridor to Wynnhaven. One artificial reef—a submerged shipwreck—is present close to shore in shallow water on the Gulf side of Santa Rosa Island (Figure A-38). Contact with this structure could affect its utility as fish habitat as well as cause damage to the surface craft. If this structure is avoided, the proposed activities conducted at Santa Rosa Island are not likely to adversely impact EFH.

Barrier Island Natural Areas

Some areas identified as barrier island natural areas occur along the Lateral Beach Corridor and Troop Movement Corridor on Santa Rosa Island. Troop or vehicle movement through these areas could impact the quality of the habitat. The perforate reindeer lichen habitat is not found in either of the corridors. Troop movement will be limited to areas seaward of the dunes, and vehicle movement will be restricted to a relatively narrow corridor close to the shoreline. Therefore, impacts to the barrier island natural areas are expected to be minimal.

Wynnhaven Beach

LCACs, AAVs, and LCUs would be employed during activities on Santa Rosa Island. Short-term increases in turbidity would occur. However, no emergent vegetation, seagrasses, oyster reefs, or artificial reefs are present within transit routes (Figure A-45). Therefore, the proposed activities at Wynnhaven Beach are not likely to adversely impact EFH.

Destin Pass

Seagrass near the bay side of Destin Pass would not be affected. No contact of amphibious vessels with the bottom would occur.

Hammock Point (TA D-84)

Shallow oyster reefs and a small amount of emergent vegetation are present at Hammock Point (Figure A-65). An artificial reef is located off Hammock Point, but it is in water over 20 feet deep. No impacts to these habitats would occur since AAVs and LCUs would not be used at Hammock Point and LCACs would not contact the bottom. LCACs may increase turbidity in nearshore waters when landing but only temporarily. Some emergent vegetation species are present at Hammock Point but site inspections indicate that this vegetation is not inundated; thus it likely does not function as fish habitat. The proposed activities at Hammock Point are not likely to adversely impact EFH.

Alaqua Point

Water depths are shallow off Alaqua Point as well; therefore, AAVs and LCUs would not be used at this location. Shallow oyster reefs and a small amount of emergent vegetation are present at Alaqua Point (Figure A-65). No impacts to these habitats would occur since AAVs and LCUs would not be used, and LCACs would not contact the bottom. Site inspections revealed that the emergent vegetation at Alaqua Point is not inundated; thus it does not function as fish habitat. The proposed activities at Alaqua Point are not likely to adversely impact EFH.

White Point

Water depths are shallow for a considerable distance off White Point; therefore, AAVs and LCUs would not be used at this location. Oyster reefs and artificial reefs are not present (Figure A-44). However seagrass beds and a small amount of emergent vegetation are located at the site. Seagrass beds would not be contacted by LCACs landing at the site, and site inspections indicate that emergent vegetation is not inundated and is not functioning as fish habitat. An increase in water turbidity is expected to occur from LCAC landings but the effects would be temporary. Therefore, the proposed activities at White Point are not likely to adversely impact EFH.

Gulf Sturgeon and Proposed Critical Habitat

Yellow River: Gulf sturgeon are found in the lower Yellow River and appear to congregate near the HWY 87 Bridge and up to a few miles north of the bridge (Craft et al., 2001). Presently, there are no designated critical habitat areas for the Gulf sturgeon (USFWS, 1998), but the area of the Yellow River from Boiling Creek to HWY 87 appears to be an important summer habitat for the sturgeon. Activities along the shore of this area that could cause potential impacts would be small boat landings (Zodiac boats only) from an R&S insertion or a small boat raid. Heavy sediment loads and low water volume from drought conditions were identified as factors potentially affecting sturgeon migration in the Yellow River. Erosion and siltation can cause eggs to be covered with sediment and prevent offspring from reaching the water column. No potential spawning sites occur within the 10 river miles of the Yellow River (Craft et al., 2001). Zodiac boats are not considered to have impacts to sturgeon habitats because of the shallow draft. Erosion and turbidity from boat landings would be minimal and would not affect known spawning sites. The landings would not result in any significant increase in shoreline small boat landings over what currently occurs as part of normal Eglin operations (approximately 1,500 per year at a number of landing sites throughout the reservation). Erosion and turbidity from small

boat landings are not widespread or significant enough to affect the Gulf sturgeon through habitat alteration.

<u>Wynnhaven Beach</u>: Gulf sturgeon are known to migrate through Santa Rosa Sound; however, there are no spawning sites, congregation sites, or relocation sites within the Sound. Also, sturgeon prefer depths of approximately 6.5 to 13 feet. Sandy, muddy substrate may be affected by AAVs moving between Santa Rosa Island and Wynnhaven Beach. The area affected would be above the mean low tide 4-foot bathymetry line (maximum depth of AAVs). Due to the area affected (4-foot depth to shore) existing outside of their primary habitat (6.5 to 13 feet), migratory movement only in the sound, and small impact area, impacts to the Gulf sturgeon through habitat alteration are not anticipated.

<u>All other locations</u> – There are no potential impacts to Gulf sturgeon or Gulf sturgeon habitat from small boat landings at Santa Rosa Sound, Wynnhaven Beach, Hammock Point (D-84), White Point, or East Bay.

As a result, ARG/MEU activities are not likely to adversely affect Gulf sturgeon individuals, populations, or critical habitat.

4.12.1.2 Impacts from Ground Movement

Habitat Impacts to Sensitive Plant Communities

Tier I plant communities and significant botanical sites are located adjacent to riverine and estuarine areas, and units may travel through them on their way to interior objectives on the reservation, such as TAs. In the Interstitial PEA (U.S. Air Force, 1998c), recommendations were made to avoid Tier I plant communities if alternative areas were available. Specifically, Hick's Creek Prairie and Whitmier Island on the Yellow River were identified as plant communities that might be susceptible to repeated foot traffic due to the hydric nature of plants and soil at the site. An assessment of Whitmier Island by Chafin and Schotz (1995) stated that the community was in very good condition despite use by the military and that damage was minimal. Standard operating procedures dictate that all vehicles are cleaned prior to use, which would eliminate the potential for the spread of invasive exotic plant species.

Sensitive plant communities also occur on the shores of Choctawhatchee Bay near White Point. In addition, they can be found in East Bay, near the mouth of the East Bay River, and just north of the river. Tier I mesic flatwoods, scrub are located north of Wynnhaven Beach and at White Point. Wet flatwoods, mesic flatwoods and scrub are located near Hammock Point (TA D-84). Tier I wet flatwoods surround RR 815 near the proposed East Bay Point landing. Tier I wet flatwoods and mesic flatwoods are located at Alaqua Point. Figures A-48 through A-55 depict Tier I plant communities near all potential landing sites. All Tier I sites and significant botanical areas would be avoided to the extent possible. Coordination with Eglin Natural Resources would ensure that no significant impacts occurred to sensitive plant communities.

Beach Dune Community

The beach dune community is one of the most predominate vegetative communities present on Santa Rosa Island (SRI). Natural dune vegetation stabilizes sands, allowing for the formation

and maintenance of the dune infrastructure. Dune vegetation also provides forage and shelter for a variety of barrier island species including the Santa Rosa Beach mouse, which is a species of special concern. Dunes also provide protection for shorebird nesting colonies. A robust primary dune system helps to prevent sea turtle hatchling disorientation by shading out inland light. Dunes also provide an important physical buffer against storms. The importance and fragility of this ecosystem dictates that operations be restricted to only those activities that have minimal impact to ground cover and dune infrastructure.

At the present time, approximately 4,300 acres of Santa Rosa Island are administered by Eglin Air Force Base. Of this total 1,862 acres or 43.3 percent fall within the footprint of MEU Readiness Training activities. During the MEU exercise, hovercraft (LCACs) as well as tracked and wheeled vehicles would operate off-road within the designated vehicle movement corridors, impacting approximately 132.9 acres (Figure A-39). Substantial troop movements may also occur anywhere east of TA A-15 and west of TS A-11, approximately 1,857 acres. Because LCACs have been shown to produce minimal sand displacement (SAIC, 1998), these craft are not expected to pose a threat to dunes. However due to the fragility of the dune ecosystem, all vehicles and troops would avoid dunes taller than 5 feet.

Piping Plover Critical Habitat

The preservation of critical habitat in wintering areas is important to the survival of piping plover populations. Quality winter foraging and roosting is necessary if adults are to survive, migrate back to breeding sites, and nest successfully (USFWS, 2001c). The Navarre Beach piping plover critical habitat (USFWS Unit FL-3) consists of 118 acres in Escambia and Santa Rosa Counties. Eglin Air Force Base and Santa Rosa Island Authority own the majority of the unit. Within property administered by Eglin, critical habitat is situated on the north shore of Santa Rosa/Okaloosa Island (SRI/OI) west of Test Site A-15. Activities associated with ARG/MEU training would not occur in or near piping plover critical habitat.

Because ARG/MEU activities will not occur in or near designated critical habitat, the proposed activities would have no effect on designated piping plover critical habitat on SRI.

Avoidance and Minimization Measures for ARG/MEU Training

- Ensure that all activities occur outside of designated piping plover critical habitat.
- Limit large-scale troop movements to areas away from fragile foraging habitat on the north shore of SRI.
- Use only designated landing areas for amphibious operations on the north side of SRI (A-12 and A-13B).
- If the Proposed Action is scheduled during the wintering season, thorough shorebird surveys would be conducted immediately before and after the action, along the south and north shores of SRI, and within vehicular movement corridors.
- If piping plovers are documented in the proposed action areas, measures would be taken to mark and protect the habitat and troop/vehicular movements would be adjusted accordingly.

- Conduct annual piping plover surveys for all Eglin properties on SRI and continue participation in the International Piping Plover Census if conducted every 5 years.

4.12.1.3 Impacts from Aviation Operations

No impacts to sensitive habitats are anticipated as the result of aviation operations.

4.12.1.4 Impacts from Munitions Use

No impacts to sensitive habitats are anticipated as the result of munitions use.

4.12.1.5 Impacts from Pyrotechnics

No impacts to sensitive habitats are anticipated as the result of pyrotechnics; however, some increased risk of wildfire would result from pyrotechnics use within the interstitial areas of the Eglin Military Complex.

Wildfires are sometimes beneficial in restoring natural communities, but it is unknown whether the wildfires potentially associated with the Proposed Action would have a net positive or negative effect on sensitive communities and species. Adjacent to the Yellow River, about 900 acres were burned from wildfires over the previous five years. Adjacent to East Bay Point, about 1,035 acres were burned. North of the East Bay River wildfires occurred possibly related to live fire activities on TAs A-77 and A-78. These fires spread south to the East Bay River burning a total of 7,100 acres, including potential salamander habitat, which may have benefited from the fire.

Sensitive habitats are sometimes destroyed by wildfires or prescribed burning, or during fire suppression activities (U.S. Air Force, 2000d). For ARG/MEU training, a wildfire operational plan would be developed with Eglin Natural Resources to identify high wildfire risk conditions and notification procedures that units would follow to engage fire response personnel when needed. Thus, impacts to sensitive habitats from pyrotechnics are not anticipated.

4.12.2 Alternative 1: Minimal Infrastructure Improvements

Potential impacts to critical habitat and sensitive plant communities would not change under this alternative.

4.12.3 No Action Alternative

MEU training would not be conducted at Eglin Air Force Base. Therefore, no impacts would occur.

4.13 CULTURAL RESOURCES

The potential adverse effects due to physical disturbance and/or destruction of cultural resources are the focus of this analysis. Cultural resources are fragile and nonrenewable resources that suffer varying degrees of impact from natural and artificial effects upon the landscape. National Register-eligible archaeological sites tend to be located in areas that in prehistoric times

contained the natural resources necessary to sustain life, particularly areas on or near streams, rivers, and shorelines. The Proposed Action has the potential to affect many areas that contained such resources.

Direct adverse effects to archaeological sites eligible for listing on the National Register may result from training exercises that include the use of tracked or wheeled vehicles, troop movement over loose, sandy soils, the use of munitions or pyrotechnics, or other activities that disturb soil. Construction activities such as clearing, grading, paving, and earth moving associated with road improvements necessary to accommodate the landing and movement of vehicles during ARG/MEU training are also likely to disturb archaeological sites.

Secondary effects to archaeological sites are often caused by soil erosion. Erosion is a serious factor of disturbance to cultural resources in interior, riverine, and coastal settings on the reservation. The rate and severity of erosion can be accelerated by undertakings such as the Proposed Action. Degradation of roadbeds in the vicinity of archaeological sites may exacerbate soil erosion and thus lead to adverse effects to the resource. Where landing site improvements such as grading and paving are undertaken, it is imperative to design erosion control measures to protect adjacent resources. Repeated troop movements in unstable areas such as riverbanks can also increase erosion. Cultural resources located in such areas can be adversely impacted as a result.

To comply with all applicable laws and regulations, the cultural resources management program at Eglin proceeds in phases that reflect the federal mandate to identify, evaluate, and consider the effects of its actions on historic properties. Identification of historic properties is conducted through systematic archaeological surveys (often referred to as Phase I surveys) directed by professional archaeologists. For purposes of inventory, the reservation has been divided into high and low probability zones for cultural resources. Inventory is not required in low probability zones. High probability zones must be inventoried for the presence of cultural resources. The site narratives below indicate where Phase I surveys will be required prior to ARG/MEU training activities.

Each archaeological site identified in the area of potential effect must also be evaluated for National Register eligibility. This is accomplished by gathering data to which the criteria of eligibility can be applied to assess significance. For archaeological sites, the data are gathered through a combination of literature review and a program of test excavation under the direction of a professional archaeologist. This process is otherwise known as Phase II test and evaluation. Until a formal Phase II evaluation is accomplished, all archaeological resources are to be treated as potentially eligible for listing on the National Register and protected as if they are listed. Resources determined ineligible through formal testing do not require further consideration.

If an archaeological site is threatened with adverse effect, measures must be developed in consultation with the SHPO to resolve the adverse effect. Avoidance of the property is the preferred method because it preserves the resources *in situ*. Where avoidance is not possible, data recovery (Phase III) excavations are warranted.

Avoidance would be accomplished by constructing a physical barrier, such as a fence, around the site, or by otherwise marking the site in the field in a manner that alerts troops to its presence. A buffer would be established around all cultural resources that are eligible for listing on the

National Register and hard points would be recorded along the buffer with a GPS. Fencing or other forms of marking would be installed around the buffer and marked with infrared tape. The buffered areas would also be marked on maps and troops involved in ARG/MEU training would be advised to avoid all areas marked in this manner. Fencing would only be necessary at sites where artifacts are located on the surface of the ground, in frequently impacted areas such as active test areas, and in highly vulnerable areas such as the soft sands of Santa Rosa Island.

Data recovery represents the last stage of intensive investigation at an archaeological site. It is the preferred alternative when significant archaeological sites cannot be avoided. The data recovery process involves the systematic removal of the artifacts (data) from their original context for analysis and permanent storage. The threat of adverse effect is mitigated through a program of work that maximizes the amount of information retrieved from a site through controlled, systematic and intensive excavation. The data recovery may be directed at all or only a portion of a significant site, depending upon the footprint of the area of potential effect.

Before data recovery can be undertaken, a work plan must be developed and submitted to the SHPO for concurrence. This may require an interim phase between data recovery and testing to delineate cultural resources and sample the contents in such a manner as to provide sufficient information to formulate a work plan that will ensure a representative sample of the site has been investigated. The percentage of the site subjected to data recovery will be specific to each property being investigated but generally does not exceed 10 percent of the total site area.

4.13.1 Proposed Action

4.13.1.1 Impacts from Amphibious Landings

LCACs

Site improvements would be required for some locations to accommodate LCACs, which require a smooth graded shoreline to transition from water to land. These site improvements represent the greatest potential impact to cultural resources, since extensive ground disturbance and modification to the topography is involved. Though LCACs have less of an impact on cultural resources than do wheeled or tracked vehicles, they have the potential to adversely effect archaeological sites by causing the direct displacement of artifacts from their original context.

<u>Wynnhaven Beach.</u> Site improvements to accommodate LCACs at the Wynnhaven Beach landing site will have an adverse effect upon archaeological site 8OK239. Site improvements will involve clear-cutting, grading, and paving the entire site area, which will result in the complete loss of the resource. To mitigate impacts, a Phase III data recovery investigation has been planned that will consist of the excavation of eight percent of the site area, followed by archaeological monitoring of clearing and construction activities. The LCACs themselves will not affect the site since it will have been mitigated by the time training exercises commence.

<u>Alaqua Point.</u> A similar situation exists at the Alaqua Point landing site. Grading and stabilization of the beach at this location will adversely effect archaeological site 8WL119 and possibly other nearby sites. If these sites cannot be avoided a data recovery plan would be developed in consultation with the SHPO. Data recovery excavations would be completed prior to site improvements, followed by archaeological monitoring during construction.

Avoidance of the archaeological sites at Alaqua Point would require archaeological delineation of the site boundaries, followed by fencing or marking the areas to be avoided. All landing site modifications would occur outside the fenced area, most likely to the west of the archaeological site, and all vehicle traffic between the landing site and HWY 20 would be routed to the north of the fence. This would require the construction of a new road connecting the landing site to the existing road that currently provides access to the highway.

The use of LCACs at Alaqua Point would be restricted to areas devoid of cultural resources or areas that have undergone data recovery investigations to mitigate the effects of site improvements.

Test Area D-84. Site improvements at D-84 to accommodate LCACs will include grading, road improvements, and the construction of concrete retaining walls to control erosion. Archaeological sites immediately to the east and west of the landing site would be avoided through fencing or marking, as necessary, in consultation with the SHPO.

Erosion is the greatest threat to the archaeological sites flanking D-84, due to the close proximity of the sites to the area to be affected by construction. The concrete retaining walls would be designed to prevent increased erosion of the archaeological sites as a result of site improvements. All construction activities at D-84 would be monitored by an archaeologist.

Test Area A-22. Archaeological sites are present west of the proposed A-22 landing site. These sites would be avoided through fencing or marking.

White Point. A portion of the White Point landing site requires archaeological inventory to locate possible cultural resources. The location of the unsurveyed portion of White Point, however, is several hundred feet from shore. Any new sites located here would be easily avoided by LCAC landings and site improvements. Site 8OK784 is located east of the White Point access road in the Maxwell-Gunter Recreation Area, a DoD recreation area. This site would also be avoided. No historic properties are located along the shoreline at White Point.

Santa Rosa Island. A Phase I archaeological survey to locate historic properties on the portion of Santa Rosa Island that would be utilized for ARG/MEU training has been completed. Cultural resources that were identified during the survey will be evaluated, in consultation with the SHPO, to determine whether they are eligible for listing on the National Register. All eligible properties would be fenced and avoided, if possible. If avoidance is not possible, a data recovery plan would be developed in consultation with the SHPO. Data recovery excavations would be completed prior to any training activities that could affect the sites.

LCACs would come ashore at test area A-13B and proceed north across the Island to Santa Rosa Sound utilizing a designated LCAC corridor. It is not known whether eligible historic properties are located within the corridor, but this portion of the island is included in the Phase I survey mentioned above. Any significant resources located within the corridor would be fenced and avoided.

Improvements on Santa Rosa Island to accommodate LCAC crossings would include trenching to bury an electrical power line. As with all other ARG/MEU activities, the placement of the

underground power line would avoid eligible historic properties if possible. Data recovery excavations would be conducted if sites cannot be avoided.

Hurlburt GOS. LCACs would avoid known archeological sites by staying on established roadbeds.

AAVs

Under the Proposed Action, AAVs would only land at Wynnhaven Beach and Santa Rosa Island. These tracked vehicles have great potential to cause direct impact to cultural resources through the displacement of soil, and secondarily through increased erosion.

Wynnhaven Beach. As discussed above, site improvements planned for the Wynnhaven Beach landing site would result in the complete loss of site 8OK239. A data recovery plan to mitigate the adverse effects of the Proposed Action has been approved by the SHPO, and data recovery would be completed prior to site improvements. The use of AAVs at Wynnhaven will therefore not affect historic properties.

Santa Rosa Island. All cultural resources on the portion of Santa Rosa Island utilized for ARG/MEU training would be identified and evaluated for National Register eligibility prior to the commencement of training exercises. Eligible properties would be fenced and avoided if possible. Sites that cannot be avoided would undergo data recovery excavations.

Small Boat (Zodiac) Raids

Zodiacs are not expected to create any significant additional erosion along shorelines and rivers. However, cultural resources that are adjacent to the landing sites may be adversely affected by the unloading of troops, displacement of sand, digging of fighting positions, or other ground-disturbing activities.

Yellow River. Archaeological surveys would be conducted at all proposed landing locations along the river. Recommendations for avoiding or mitigating adverse effects to cultural resources at these landing sites would be presented to the SHPO following completion of the surveys, and mitigation measures would be carried out prior to the use of these landing sites for small boat raids. Depending on the location and size of the sites to be avoided, mitigation measures would likely involve marking or fencing sites to route troops around sensitive areas.

Troop movement is unlikely to affect archaeological sites along the Yellow River unless artifacts are located on the surface of the ground. If such sites cannot be avoided, a limited amount of data recovery could be employed to clear a corridor for troop movement through the site, allowing other portions of the site to remain intact.

All ground-disturbing activities, such as the establishment of fighting positions, would occur only in areas known to be devoid of cultural resources, or in areas cleared by data recovery excavations.

Sloping or eroding riverbanks are particularly sensitive to repeated foot traffic. Cultural resources located in such an environment are vulnerable to adverse effects of troop movement up

and down the banks. Avoidance of archaeologically sensitive riverbanks would be achieved where possible. Mitigation alternatives would be developed in consultation with the SHPO in cases where avoidance is not possible. Limited data recovery could be employed to clear portions of the riverbank for foot traffic. Alternatives include the construction of wooden steps or the placement of protective matting.

East Bay Point. Several National Register-eligible or potentially eligible archaeological sites are located within the East Bay Point area of operations. As at the Yellow River landing sites, cultural resources along the eroding shore at East Bay may be adversely affected by the movement of troops up and down the exposed banks. Additionally, the digging of fighting positions or other ground-disturbing activities may affect historic properties along the shore or archaeological sites inland from the shore.

A combined Phase I and Phase II archaeological survey to delineate the boundaries of these sites and determine the eligibility of potentially eligible sites would be conducted prior to the use of the area for small boat raids. Recommendations for avoiding or mitigating adverse effect to cultural resources at East Bay Point would be developed in consultation with the SHPO.

Alaqua Point. Several National Register-eligible archaeological sites are located within the East Bay Point area of operations. Cultural resources along the eroding shore at Alaqua Point may be adversely affected by the movement of troops up and down the exposed banks. The digging of fighting positions or other ground-disturbing activities may also affect historic properties. The archaeological sites inland from the shore are thought to be buried deeply enough to be naturally protected from foot traffic, but the use of wheeled vehicles as light as HMMWVs or SUVs has the potential to adversely effect these sites.

Archaeological delineation of site boundaries and depth of deposits would be accomplished prior to the use of Alaqua Point for small boat raids. Recommendations for avoiding or mitigating adverse effect to cultural resources at Alaqua Point would be developed in consultation with the SHPO. Avoidance of the archaeological sites at Alaqua Point would most likely require fencing or marking the areas to be avoided by small vehicle traffic. Foot traffic would likely be possible anywhere except along eroding bluffs. Limited data recovery could be employed to clear portions of the bluff for foot traffic. Alternatives include the construction of wooden steps or the placement of protective matting.

LCUs

LCUs would come ashore only at the gravel offload area at Hurlburt Field. No site improvements would be required. The National Register-eligible archaeological sites located to the east and west of the gravel offload area would not be affected.

4.13.1.2 Impacts from Ground Movement

LCACs

Santa Rosa Island. A Phase I archaeological survey to locate historic properties on the portion of Santa Rosa Island that will be utilized for ARG/MEU training has been completed. Cultural resources identified during the survey will be evaluated, in consultation with the SHPO, to

determine whether they are eligible for listing on the National Register. All eligible properties would be fenced and avoided, if possible. If avoidance is not possible a data recovery plan would be developed in consultation with the SHPO. Data recovery excavations would be completed prior to any training activities that could affect the sites.

LCACs would come ashore at Test Area A-13B and proceed north across the Island to Santa Rosa Sound utilizing a designated LCAC corridor. It is not known whether eligible historic properties are located within the corridor, but this portion of the Island is included in the Phase I survey mentioned above. Any significant resources located within the corridor would be fenced and avoided.

Improvements on Santa Rosa Island to accommodate LCAC crossings would include trenching to bury an electrical power line. As with all other ARG/MEU activities, the placement of the underground power line would avoid eligible historic properties if possible. Data recovery excavations would be conducted if sites cannot be avoided.

Tracked Vehicles

Tracked vehicles include AAVs and M1A1 tanks. AAVs would utilize the interstitial areas of Santa Rosa Island, multiple test areas, and Eglin range roads. M1A1 tanks would only utilize established tank trails on the eastern portion of the reservation, Range Roads 253, 259, and 668, TA B-75, and TA C-52. Tracked vehicles are heavy and highly maneuverable, and thus present an inherent capability for severe adverse impacts to cultural resource sites. These vehicles are capable of impacting sites through the tearing and grinding of soils. Compaction of soils caused by the sheer weight of the vehicles can also cause adverse effects to sites.

<u>Santa Rosa Island.</u> The potential impacts to cultural resources on Santa Rosa Island as a result of tracked vehicle movement, as well as the strategy to locate, evaluate, and mitigate these impacts, are identical to the impacts discussed above under LCAC movement.

A concrete road crossing would be established at TA A-13B to protect the asphalt road from tracked vehicle damage. This area has been recently surveyed for the presence of cultural resources. If National Register-eligible sites exist within the area to be disturbed by road construction, mitigation measures would be developed in consultation with the SHPO. Mitigation would be completed prior to road construction.

<u>Test Areas.</u> Several test areas on Eglin contain National Register-eligible or potentially eligible archaeological sites. Known sites that are potentially eligible would be subjected to a Phase II archaeological evaluations to determine eligibility prior to the operation of tracked vehicles on these test areas. All eligible properties would be avoided through fencing or marking, as appropriate, in consultation with the SHPO. If sites cannot be avoided, data recovery excavations would be conducted prior to training.

Portions of many test areas are considered high probability zones for the presence of archaeological resources. These areas would be designated on maps and avoided by tracked vehicles during training activities. High probability zones that cannot be avoided will be subjected to Phase I and Phase II archaeological surveys to locate and evaluate cultural

resources. Eligible properties identified during the survey would be treated as discussed in the previous paragraph.

Roads. Operating tracked vehicles on designated range roads does not pose a risk of adverse effect to cultural resources except where road improvement or widening may occur. Road improvements to accommodate tracked vehicles on Range Roads 253, 259, and 668 include the replacement of bridges and culverts, clearing and grading to allow the passage of larger vehicles, the straightening of curves, the construction of concrete tank crossings at intersections, and the construction of maintenance turnouts.

Where these range roads pass through areas designated as high probability zones, Phase I and Phase II archaeological surveys are underway to locate and evaluate cultural resources. Eligible properties identified during the survey would be avoided during road improvement activities if possible. Where avoidance is not possible, mitigation strategies would be developed and carried out in consultation with the SHPO. It is likely that limited data recovery in the portions of the sites adversely affected by construction would be an acceptable alternative to complete site excavation.

Wheeled Vehicles

Wheeled vehicles include HMMWVs, LAVs, 7-ton trucks, towed Howitzers, and flatbed trucks. All wheeled vehicles would be confined to existing roadways within interstitial areas of the Eglin Reservation (with the exception of Santa Rosa Island), areas immediately surrounding LZ/DZs, and test areas. Heavy wheeled vehicles pose as much of a risk to archaeological resources as tracked vehicles. The analysis of impacts and site protection strategies is essentially the same.

Santa Rosa Island. The potential impacts to cultural resources on Santa Rosa Island as a result of wheeled vehicle movement, as well as the strategy to locate, evaluate, and mitigate these impacts, are identical to the impacts discussed above under LCAC movement.

Test Areas and LZ/DZs. Several test areas and LZ/DZs on Eglin contain National Register-eligible or potentially eligible archaeological sites. Known sites that are potentially eligible would be subjected to Phase II archaeological evaluations to determine eligibility prior to the operation of wheeled vehicles on these test areas. All eligible properties would be avoided through fencing or marking, as appropriate, in consultation with the SHPO. If sites cannot be avoided, data recovery excavations would be conducted prior to training.

Portions of many test areas are considered high probability zones for the presence of archaeological resources. These areas would be designated on maps and avoided by wheeled vehicles during training activities. High probability zones that cannot be avoided will be subjected to Phase I and Phase II archaeological surveys to locate and evaluate cultural resources. Eligible properties identified during the survey would be treated as discussed in the previous paragraph.

Roads. Road improvements to accommodate larger vehicles along Range Roads 253, 259 and 668 have already been discussed above. In addition, Range Road 666 on Hurlburt Field would require improvements to accommodate large wheeled vehicles traveling to Range Road 253 from

the Hurlburt gravel offload area. Improvements would include increasing the curve radius in one location, the replacement of a culvert, and the improvement of the intersection of the road with Range Road 253. Range Road 666 passes through a high probability zone that is currently undergoing a Phase I survey, and will be subjected to Phase II evaluation if necessary. The Phase II survey and any subsequent mitigation measures would be conducted in consultation with the SHPO and coordinated through Hurlburt's environmental office.

Troops

Troop movement is unlikely to affect archaeological sites except where artifacts are located on the surface of the ground, the soil is exceptionally soft or devoid of vegetation, or foot traffic occurs on steep slopes such as along riverbanks, shoreline bluffs, or interior gullies. Historic period archaeological sites, such as the remains of homesteads and turpentine camps, often contain concentrations of artifacts on the surface of the ground. Sites on Santa Rosa Island, although predominately subsurface, are vulnerable to foot traffic because of the loose sand matrix containing the artifacts. Also of concern when evaluating potential impacts from troop movements is the crossing of streams and the slopes flanking streams. Areas located within 200 meters of fresh water are generally regarded as high probability zones for the presence of cultural resources.

All eligible archaeological sites on Santa Rosa Island would be fenced and avoided if possible. Where avoidance is not possible, data recovery excavations would be developed and carried out in consultation with the SHPO.

All eligible archaeological sites in the interior of the Eglin Reservation, to include designated troop movement areas, test areas, LZ/DZs, landing sites, and interstitial areas, would be assessed for risk of damage resulting from troop movement. Sites that are deemed vulnerable due to factors such as the presence of surface artifacts, soft soil, or steep slopes, would be fenced and avoided, as appropriate, in consultation with the SHPO.

Areas designated as high probability zones that have not yet been surveyed for the presence of cultural resources would be marked on maps and avoided by troops if possible. Where troops must operate in high probability zones, vulnerable areas would be avoided. Vulnerable areas include steep slopes along watercourses, soft, sandy soil, and areas where artifacts (glass, bricks, arrowheads, pottery sherds, barrel hoops, ceramic cups, etc.) are noted on the surface of the ground. Troops would be prohibited from collecting or moving artifacts from their original locations.

All ground-disturbing activities, such as the establishment of fighting positions, would occur only in areas known to be devoid of cultural resources, or in areas cleared by data recovery excavations.

4.13.1.3 Impacts from Aviation Operations

Aviation operations would not affect cultural resources.

4.13.1.4 Impacts from Munitions Use

Munitions would be used only in areas known to be devoid of cultural resources or in areas frequently used for that purpose. Some portions of active test areas contain high probability zones that are likely to contain archaeological sites. These would be subjected to Phase I and Phase II surveys prior to the use of munitions except where frequent munitions use has made the presence of intact sites highly unlikely, or where the presence of unexploded ordnance precludes archaeological surveys due to safety concerns.

4.13.1.5 Impacts from Pyrotechnics

Pyrotechnics would be used only in areas known to be devoid of cultural resources or in areas frequently used for that purpose. Some portions of active test areas contain high probability zones that are likely to contain archaeological sites. These would be subjected to Phase I and Phase II surveys prior to the use of pyrotechnics except where frequent pyrotechnics use has made the presence of intact sites highly unlikely, or where the presence of unexploded ordnance precludes archaeological surveys due to safety concerns.

4.13.2 Alternative 1: Minimal Infrastructure Improvements

Alternative 1 involves all the training activities as described under the Proposed Action, with the exception of the listed site/infrastructure improvements. This alternative would allow the conduct of most of the training activities but would require administrative access to Eglin's mainland reservation training areas. Administrative access refers mainly to the use of trucks and lowboys to haul tracked vehicles to the training areas. Additionally, without the necessary site improvements, some of the amphibious landing locations identified under the Proposed Action could not be fully utilized for this alternative.

<u>Wynnhaven Beach.</u> No ARG/MEU training activity would be conducted at Wynnhaven Beach under Alternative 1. Therefore, cultural resources would not be affected.

<u>Alaqua Point.</u> Site improvements to accommodate LCACs would not be necessary at Alaqua Point under Alternative 1. Therefore, potential disturbance would be limited to small boat raids. Archaeological delineation of site boundaries and depth of deposits would be accomplished prior to the use of Alaqua Point for small boat raids. Recommendations for avoiding or mitigating adverse effects to cultural resources at Alaqua Point would be developed in consultation with the SHPO. Avoidance of the archaeological sites at Alaqua Point would most likely require fencing or marking the areas to be avoided by small vehicle traffic. Foot traffic would likely be possible anywhere except along eroding bluffs. Limited data recovery could be employed to clear portions of the bluff for foot traffic. Alternatives include the construction of wooden steps or the placement of protective matting.

<u>Test Area D-84.</u> No ARG/MEU training activity would be conducted at Wynnhaven Beach under Alternative 1. Therefore, cultural resources would not be affected.

<u>Test Area A-22.</u> LCACs would utilize the landing site at A-22 under Alternative 1. Archaeological sites are present west of the proposed A-22 landing site. These sites would be avoided through fencing or marking.

White Point. LCACs would utilize the landing site at White Point under Alternative 1. A portion of the White Point landing site requires archaeological inventory to locate possible cultural resources. The location of the unsurveyed portion of White Point, however, is several hundred feet from shore. Any new sites located here would be easily avoided by LCAC landings and ground movement of vehicles and troops. Site 8OK784 is located east of the White Point access road in the Maxwell-Gunther Recreation Area. This site would also be avoided. No historic properties are located along the shoreline at White Point.

Santa Rosa Island. A Phase I archaeological survey to locate historic properties on the portion of Santa Rosa Island that will be utilized for ARG/MEU training has been completed. Cultural resources identified during the survey will be evaluated, in consultation with the SHPO, to determine whether they are eligible for listing on the National Register. All eligible properties would be fenced and avoided, if possible. If avoidance is not possible a data recovery plan would be developed in consultation with the SHPO. Data recovery excavations would be completed prior to any training activities that could affect the sites.

Yellow River. Use of the Yellow River under Alternative 1 would be no different from the Proposed Action.

East Bay Point. Use of the East Bay Point landing site under Alternative 1 would be no different from the Proposed Action.

Roads. Improvements to Range Roads 253, 259, 668, and 666 would still be required under Alternative 1. Where these range roads pass through areas designated as high probability zones, Phase I and Phase II archaeological surveys would be conducted to locate and evaluate cultural resources. Eligible properties identified during the survey would be avoided during road improvement activities if possible. Where avoidance is not possible, mitigation strategies would be developed and carried out in consultation with the SHPO. It is likely that limited data recovery in the portions of the sites adversely affected by construction would be an acceptable alternative to complete site excavation.

Ground Movement. Potential impacts to cultural resources as a result of vehicle use, troop movement, the digging of fighting positions, and other ground-disturbing activities under Alternative 1 would be no different from the Proposed Action.

4.13.3 No Action Alternative

ARG/MEU training would not be conducted at Eglin Air Force Base. Therefore, no impacts would occur.

4.14 CUMULATIVE IMPACTS

The CEQ regulations for accomplishing NEPA (42 U.S.C. Sections 4321-4370d) define cumulative impacts as the *impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions*

regardless of what agency (Federal or non-federal) or person undertakes such other actions (40 CFR 1508.7).

Previous sections of Chapter 4 (Environmental Consequences) considered the cumulative environmental impact of the Proposed Action (and alternatives) when added to the environmental impact of other past and present actions. The cumulative environmental impact of the proposed ARG/MEU readiness training when added to other reasonably foreseeable future actions is considered in this section. NEPA regulations require a discussion of those cumulative impacts with the potential for significance. Since the Proposed Action occurs primarily on Eglin AFB, other reasonably foreseeable projects and missions on Eglin AFB, particularly those that focus on training, are the focus of this analysis.

4.14.1 Reasonably Foreseeable Future Actions in the Vicinity of the Proposed Action

Readiness Training Center

The proposed Readiness Training Center at Eglin AFB would enable an eventual permanent beddown of a Readiness Training Squadron with garrison support facilities and natural terrain training areas. This would include the construction of garrison and “military operation over urban terrain” (MOUT) facilities. The Draft Readiness Training Center Environmental Assessment was released to the public for review in March 2003.

Navy Composite Training Unit Exercise (COMTUEX) and Joint Task Force Exercise (JTFEX)

An environmental assessment, entitled Final U.S. Navy COMTUEX and JTFEX Training was prepared in March 2000, and a Finding of No Significant Impact signed for the expenditure of 250 live Mk-82 bombs during twice annual COMTUEX and JTFEX training at Eglin AFB. Additional environmental documentation would be prepared for future proposed COMTUEX and JTFEX training that would potentially involve actions beyond the scope of the previous COMTUEX/JTFEX analysis. JTFEXs are currently conducted along the eastern seaboard but use Eglin AFB on a limited basis for long-range strikes from the Virginia Capes Operating Area and the Jacksonville Operating Area. Years in which two Gulf of Mexico COMPTUEX’s occur would require two nine-day periods of range operations. During these nine days, a Navy carrier would schedule approximately 1,100 fixed wing sorties. Approximately 650 sorties, between 24 and 72 each day, would conduct operations within the Eglin Military Complex performing strike and strike support missions. Approximately 400 of these sorties (200 Strike, 100 Close Air Support, 100 Unit Level Bombing), between 24 and 48 each day, would be ordnance delivery sorties expending live and inert weapons against tactical ground targets.

Introduction of the Advanced Assault Amphibious Vehicle. The Department of the Navy proposes to replace the Assault Amphibious Vehicle with a new generation weapons system called the Advanced Assault Amphibious Vehicle (AAAV). Introduction of the AAAV to east coast Marine Corps installations is not expected to occur until 2008. The environmental impacts of introduction of the AAAV will be subject to separate, independent NEPA analysis.

Introduction of the V-22 Osprey. The Department of the Navy proposes to replace the CH-46 helicopter with a new generation weapons system called the V-22 Osprey. Introduction of the V-22 to the 2nd Marine Aircraft Wing at Marine Corps Air Station, New River, is expected to occur within the next few years.

4.14.2 Potential Cumulative Impacts

Potential cumulative impacts from past, present, and future military actions are described below by resource. Non-military actions that may have a cumulative effect in conjunction with the Proposed Action are considered where applicable. A Potential Cumulative Impacts Summary is presented in Table 4-34.

Transportation

The Proposed Action could potentially coincide with future road construction or improvements at HWY 98, HWY 20, or White Point Road. Since under the Proposed Action advance notification and coordination with county law enforcement and the Florida Department of Transportation would occur, no significant cumulative impacts would result. Additionally, special operations training (e.g., Army Rangers, AFSOC, or Navy Seals) presently conducted at Eglin AFB periodically requires military personnel engaged in small boat landings at Wynnhaven Beach to cross HWY 98 and proceed into the reservation on foot. This type of training usually does not require closure of the highway. Thus, the Proposed Action and current missions would not have combined transportation impacts.

Socioeconomics

As identified in Chapter 4, the Proposed Action would not have significant adverse socioeconomic impacts, though some slight beneficial impact to the economy may occur as a result of hiring local contractors to perform needed road/site improvements and the participation of ARG/MEU personnel in the market economy (during the NEO). Other aspects of the socioeconomic environment such as restricted access, tourism, and commercial and recreational fishing may potentially be affected by the increased use of the offshore areas of the Gulf of Mexico. While the Proposed Action involves the use of offshore areas, it would not involve large-scale closures of areas that may also be used for commercial and recreational fishing, as Navy vessels observe a 500-foot buffer within which other vessels may not approach. Thus, the combined impacts of the Proposed Action with other future activities to commercial and recreational fishing and restricted access would not be significant.

Noise

Noise impacts may be cumulative in the sense that the average ambient noise of an area could increase from several independent actions, or the increased number of noise events of a particular kind (e.g., an explosion) from unrelated actions may result in an increased sensitivity of human receptors and therefore an increase in the number of complaints. The Proposed Action would produce noise that is similar to ongoing activities at Eglin AFB and noise that is unique, particularly along some land-water interfaces. Specifically, noise from amphibious vessels at the Wynnhaven Beach and White Point BLZ represents the introduction of a new type of noise at these areas. Presently the noise environment is dominated by aircraft overflights and/or highway

traffic. The impact on the annual average noise of the Proposed Action was considered. The addition of noise at the BLZs from amphibious landings would not detectably increase the annual average noise environment given the disproportionately larger number of aircraft overflights and the continuous contribution of traffic noise experienced at these locations. However, the addition of new and novel noise events to an already noisy environment may potentially result in increased or new noise complaints. One future project, the addition of the Advanced Amphibious Assault Vehicle may lead to a change of noise at some of the landing sites currently featured in the Proposed Action. The environmental impacts of introduction of the AAAV will be subject to separate, independent NEPA analysis.

Noise from bombs may represent a repetitive noise event that may, combined with other bomb noise from other missions, cause an increase in the number of complaints. To analyze this potential, the number of live bombs dropped over the past few years was considered in relation to the number of live bombs proposed for ARG/MEU training. The number of live bombs dropped at Eglin AFB varied from 290 in 1996 to 798 in 2000. Under the Proposed Action, 42 live bombs are proposed for the 10-day event or about 84 live bombs per year, which represents a 9.5 percent increase over the 2000 numbers or a 22.4 percent increase over the 1996 amount. The 2000 numbers represent a year in which a COMTUEX/JTFEX training event occurred and a large percentage of the live munitions are attributable to this exercise. Noise modeling and careful attention to weather conditions known to propagate (i.e. spread) noise minimized the effects of bomb noise from the COMTUEX/JTFEX on the community. Continuing these management practices for the Proposed Action and other training events involving live bombs would minimize potential cumulative effects such that there would be no significant impacts.

Safety

There would be no cumulative safety impacts from the Proposed Action. The Proposed Action would not be conducted concurrently and in the same vicinity with other test or training missions. Future missions would have no bearing on the safety of the Proposed Action. Thus, there would be no combined safety concerns.

Wetlands

The Proposed Action involves the transport of AAVs through wetland areas. Presently other actions (i.e. training missions) occurring on Eglin AFB that take place in or near wetlands primarily involve foot traffic. Generally, for construction projects on Eglin AFB, wetlands are avoided. Similarly, the AAV operations would seek to avoid wetlands. There would be no cumulative impacts to wetlands from the Proposed Action in combination with other current or future actions.

Floodplains and Coastal Zone

There would be no cumulative impacts to floodplains or the coastal zone. Historically, there has never been an issue with floodplains due to the conduct of missions on Eglin property. No inconsistencies with the state’s Coastal Zone Management Plan have been identified for past missions.

Water Resources and Water Quality

There would be no cumulative impacts to water resources and water quality. All training missions occurring on Eglin property are required to adhere to waste water collection procedures. Other water quality permits (i.e. stormwater) are obtained as required by law.

Air Quality

Cumulative air quality analysis considered all Eglin reportable emissions, which includes non-mission activities as well as mission actions, and county totals. The potential contribution of air emissions from the Proposed Action was evaluated in Chapter 4 with respect to overall Eglin air emissions and county emissions and found not to be significant. Thus, there are no significant cumulative impacts with respect to air quality.

Soils/Erosion

In addition to other training missions or proposed projects in which construction, land clearing, or road improvements play a major part (e.g., Readiness Training Center), routine road maintenance together with the Proposed Action would potentially result in cumulative soil/erosion impacts on Eglin AFB. Certain roads have been identified on Eglin as erosion problem areas and a program is in place to implement measures to prevent erosion. Since all new mission projects and routine road maintenance actions on Eglin AFB with the potential to impact soils and or create erosion are required to adhere to best management practices, there would be no significant cumulative impacts.

Hazardous Materials/Solid Waste

Potential cumulative Hazardous Materials/Solid Waste impacts involve multiple or combined occurrences of spills, emissions, and by-products from past, present, and future actions, and the continuous deposition of solid debris, waste, or unexploded ordnance in test and training areas. Cumulative impacts from spills would not be significant since Eglin AFB requires that all spills be reported and spill control personnel be on hand during fueling operations to control any spills that do occur. Cumulative impacts from waste products would not be significant since collection and proper disposal of wastes is mandatory for all actions in which such wastes would be produced. The potential cumulative impacts of all past, present, and future ordnance emissions and by-products, in combination with ARG/MEU training activities, is more difficult to assess. At Eglin, UXO and debris cleanup from around test area targets is conducted yearly; thus cumulative impacts of hazardous materials on test areas would not be significant. The deposition of brass cartridges from small arms blank fire comprises the majority of training debris and would potentially result in accumulations in some locations of the interstitial areas and Santa Rosa Island. While some groups make an effort to pick up their debris and are required to account for any lost items, others do not. Even so, the accumulation of spent brass would not have significant cumulative impacts in the foreseeable future.

Sensitive Species

Observance of management requirements and terms and conditions resulting from consultation with the U.S. Fish and Wildlife Service and the National Oceanic and Atmospheric

Administration Office of Fisheries will minimize the extent of adverse impacts. Close monitoring of species numbers on Eglin AFB and continued coordination of the Air Force with federal agencies regarding sensitive species will ensure that no significant cumulative impacts occur.

Sensitive Habitats

Potential cumulative impacts from future actions may occur to sensitive habitat but would not be significant. The introduction of the AAAV to future ARG/MEU training events would potentially lead to degradation of sensitive habitats, such as seagrass, at some beach landing sites. Under the Proposed Action, some sites are not currently used for tracked vehicles due to inaccessibility, but more sites would potentially become accessible by the longer-range AAAV. The wider distribution of tracked vehicles under this future activity would also potentially result in increased shoreline and wetland impacts at other beach landing sites. Coordination with FDEP, habitat surveys and management practices, and avoidance measures would be implemented to protect sensitive habitats or restore habitats that have been affected by ARG/MEU training. Thus, the cumulative impacts would not be significant.

Cultural Resources

All past, present, and future projects that would be potentially impactive to cultural resources would have undergone or would undergo a Section 106 review and, as necessary, would be mitigated. Thus, the Proposed Action, in conjunction with other projects, would not have significant cumulative impacts.

Table 4-34. Potential Cumulative Impacts Summary

Alternative	**Mission Use/Activity**																
Issue	FCE	R&S	Helo Raid	RGR	SBR	ALR	MRW	MRD	MEU	Road X-ing	SACEX	LF/M	DA	NEO	WD	TO	SO
Proposed Action																	
Transportation	○	○	○	○	○	○	○	○	○	●	○	○	○	○	○	○	○
Socioeconomics	✕	✕	✕	○	✕	○	○	○	○	◑	○	○	○	○	✕	✕	○
Noise	○	✕	✕	○	✕	●	◑	○	●	○	●	●	○	○	●	○	○
Safety	◑	◑	◑	◑	◑	◑	◑	◑	◑	◑	◑	◑	◑	◑	◑	◑	○
Wetlands	○	○	○	○	◑	●	●	◑	●	○	◑	◑	○	○	●	○	○
Floodplains	○	○	○	○	○	●	●	◑	●	○	◑	◑	○	○	●	○	○
Water Quality	○	○	○	○	○	●	●	◑	●	○	◑	◑	○	○	●	○	○
Air Quality	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Soils/Erosion	○	○	○	○	◑	◑	◑	◑	◑	○	○	◑	○	○	◑	○	○
HAZMAT/ Solid Waste	○	○	✕	◑	✕	○	○	○	○	○	✕	✕	✕	○	○	○	○
Restricted Access	◑	◑	◑	◑	◑	◑	◑	◑	●	●	●	◑	◑	◑	◑	◑	○
Sensitive Species	○	○	○	○	◑	●	●	◑	●	○	●	●	○	○	●	○	○
Sensitive Habitats	○	○	○	○	◑	●	●	◑	●	○	◑	◑	○	○	●	○	○
Cultural Resources	○	○	○	○	◑	●	●	◑	●	○	○	◑	○	○	●	○	○
Environmental Justice	○	○	○	○	✕	○	○	○	○	○	○	○	○	○	○	○	○
No Action																	
All Resources	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

✕ = Similar to Current Activity on Eglin with No Impact; ○ = No Potential Impact and No Potential Constraints/Permits Required
◑ = Minimal Potential Impacts, Potential Minor Constraints/Considerations Recommended; ● = Potential Impacts, Constraints/Management Requirements Necessary

FCE = Insertion of Forward Command Element
R&S = Insertion of Reconnaissance & Insertion Team
Helo. Raid = Helicopter Raid
RGR = Rapid Ground Refueling
SBR = Small Boat Raid

ALR = Amphibious Landing Rehearsal
MRW = Mechanized Raid Wet
MRD = Mechanized Raid Dry
MEU = MEU Landing
Road X-ing = Major Highway Crossing

LF/M = Live Fire and/or Maneuver
DA = Direct Action
NEO = Non-Combatant Evacuation Operation
WD = Withdrawal
TO = Tech/OPFOR
SO = Ship Operations

5. PLANS, PERMITS, AND MANAGEMENT REQUIREMENTS

5.1 TRANSPORTATION

Plans

An overall demand management plan will be made part of the project implementation plan. The plan will include:

- An overall traffic management plan will be prepared to support the Proposed Action. The plan will include:
  - The actual time of road closures to avoid peak seasonal traffic volumes and A.M. and P.M. peak hour traffic volumes.
  - Issue press releases that fully define the purpose and need, Proposed Action components, and the time and duration of anticipated road closures and detours, to local print, radio, and television media representatives at least two weeks in advance of the first day of each 10-day exercise.
  - Issue prominent public notices to be placed in local newspapers at least two weeks in advance of the first day of each 10-day exercise to inform the public of the time and duration of anticipated road closures and detours.
  - Deploy temporary on-road variable electronic message signs at locations where closures are anticipated at least two weeks in advance of the first day of each 10-day exercise. Messages will specify the time and date of the anticipated closures on a continuous basis for the two week period.
  - Contact representatives from all local emergency service providers, public works departments of local governments, and school districts in the vicinity at least two weeks in advance of the first day of each 10-day exercise to clarify the time and date of the anticipated closures and detours.

- An overall traffic congestion and incident management plan will be made part of the project implementation plan. The plan will include:
  - Coordination with law enforcement to ensure emergency vehicles are not impeded.
  - Coordination with law enforcement at intersections impacted by backups so vehicles do not block travel movements through intersections.
  - Definition of the content and location of fixed signs and variable messaging signs to aid and guide motorists.

Permits

No permits would be required.

Management Requirements

Management Requirements are addressed under Plans.

5.2 SOCIOECONOMICS

5.2.1 Population and Economy, Employment, Tourism

No permits, plans, or management requirements are required

5.2.2 Commercial and Recreational Fishing:

No permits or plans are required.

Management Requirements

The Proponent will implement the following management requirements:

- NOTMARs stating the location and duration of the proposed operations in public waterways including the Gulf of Mexico, Santa Rosa Sound, East Bay, and Choctawhatchee Bay will be issued. This would allow fishing boats to select alternate routes and destinations.

5.2.3 Restricted Access:

No permits or plans are required.

Management Requirements

The Proponent will implement the following management requirements:

- Restricted Access areas will be restricted by road barriers and the posting of signs:
- Coordination with Florida Fish and Wildlife Conservation Commission will be required for short duration restricted access during AAV crossings from SRI to Wynnhaven.
- Closing corridors to the beach landing zones will require a Notice to Mariners (NOTMAR).
- If nonmilitary personnel were to enter into, or near, a landing zone, training activity would simply cease until the area was cleared.
- A press release would be issued to local media and a substantial amount of time and manpower would be needed to post and barricade Eglin's vast perimeter.
- Advanced notifications are made to the media by AAC Public Affairs Office Access to closed areas is permitted to military personnel, civil servants, and contractors if a z-clearance has been granted by Range Operations Control Center.
- Advanced scheduling of MEU Training events at Eglin would allow the greatest flexibility in terms of public notification of restricted access and closures. As soon as scheduling the events was feasible, coordination with the public affairs and natural resources Branch of Eglin would be required to ensure dissemination of restricted access and closure information.

5.2.4 Environmental Justice:

No permits, plans, or management requirements are required.

5.3 NOISE

No permits or plans are required.

Management Requirements

Management requirements for noise include measures to minimize and reduce the noise or provide public notification. The Proponent will implement the following management requirements:

- Provide advance notification of training exercises to the public.
- Conduct real-time noise modeling to incorporate the noise propagating effects of current weather conditions to manage bombing and artillery events.
- Conduct noise monitoring of the proposed MEU landings to measure the accuracy of noise predictions.

5.4 SAFETY

Plans

A wildfire operational plan will be required to ensure adequate coordination between ARG/MEU participants and Eglin Natural Resources in the event of a wildfire.

Permits

No permits are required

Management Requirements

The Proponent will implement the following management requirements:

- Existing fire management protocols will be observed.
- For ARG/MEU training, Eglin Natural Resources wildfire management personnel will be on-hand to respond to any fires and the safety impacts would not be significant.
- Safety footprints will be required for all live munitions use.
- Coordination with Eglin's or Hurlburt's Safety Office (AAC/SEU or AFSOC/SE) will be conducted.
- AAC safety procedures will be followed while on the Eglin Reservation except where USMC procedures are more restrictive.
- Individual weapon safety footprints to the test areas on base will be established by AAC/SEU when all munitions (including type and quantity) were established.
- In accordance with Eglin AFB's current method of operation, AAC/SE will determine the risk from UXO and employ control measures based on an informal analysis of the action and the risk factors.

5.5 SOILS/EROSION

Plans

Site improvement and engineering design plans detailing the extent of site improvements will be required for all beach landing sites and roadways needing improvements.

Permits

Appropriate road improvement permits will be required. Road improvements must adhere to the *Eglin Air Force Base Range Road Maintenance Handbook* (U.S. Air Force, 2001d) to minimize potential erosion impacts from road improvements and maintenance activities. There are wetlands located along RR 259 that may potentially be impacted by these proposed road improvements. Any such activities would require permits from the Army Corps of Engineers and the Florida Department of Environmental Protection.

Management Requirements

The Proponent will implement the following management requirements:

- Avoid trampling stream bank vegetation and the creation of “crossing” ruts.
- Avoid sensitive seepage slopes and steepheads, which are vulnerable to erosion, and erosion restoration sites.
- Road improvements will adhere to the Eglin Air Force Base Range Road Maintenance Handbook.
- Conduct monitoring to determine the full extent of impacts from tracked vehicle use and whether or not minimization procedures are adequate to prevent erosion.
- Observe off-road restrictions.
- Shoreline site improvements will adhere to best management practices (e.g., shoreline stabilization techniques such as silt curtains and use of hay bales) to minimize erosion during construction activities.
- Sand dunes on SRI greater than 5 feet in height will be avoided.

5.6 WETLANDS

Plans

- Site improvement and engineering design plans detailing the extent of site improvements will be required for all beach landing sites and roadways needing improvements.

Permits

- Proposed road and bridge improvement activities along RR 259 and RR 253 require permits from the Army Corps of Engineers Section 404 permit and the Florida Department of Environmental Protection. Bridge improvements will also require coordination with the U.S. Coast Guard.

- Depending on the scope of activities, National Pollutant Discharge Elimination System (NPDES) and Florida Administrative Code (FAC) 62-25 Stormwater Permits will be required for site and road improvements.
- Digging permits will be coordinated with AAC/EMSN, AAC/EMR, AAC/EMH, and AAC/EMC.

Management Requirements

The Proponent will implement the following management requirements:

- Maneuver around wetlands whenever possible for all activities on foot and by vehicle.
- Avoid digging in wetland areas.
- Management requirements for shoreline site improvements for LCAC landings are detailed under Soils.
- Management requirements for improvements on range roads are detailed under Soils.
- A Finding of No Practicable Alternatives Report will be prepared in accordance with Executive Order 11990.

5.7 FLOODPLAINS

Plans

- Site improvement and engineering design plans detailing the extent of site improvements will be required for all beach landing sites and roadways needing improvements.

Permits

- Site improvements for LCAC landings at Alaqua Point, TA D-84, White Point, East Bay Point, and Wynnhaven Beach require a Joint Works in the Water Permit and a Section 404 Permit.
- Modifications to the floodplain at the Range Road 259 and Range Road 253 bridges would require a Joint Works in the Water Permit, a Section 404 Wetlands Permit, an NPDES Permit, and a Finding of No Practicable Alternatives.

Management Requirements

The Proponent will implement the following management requirements:

- Troops will avoid digging in floodplains.
- Management requirements for site improvements for LCAC landings at Alaqua Point, TA D-84, White Point, East Bay Point, and Wynnhaven Beach are detailed under Soils.
- Management requirements for site improvements and road/bridge improvements on are detailed under Soils.

5.8 WATER QUALITY

Plans

Site improvement and engineering design plans detailing the extent of site improvements will be required for all beach landing sites and roadways needing improvements.

Permits

An NPDES construction permit would be required for improvements and modifications at the following areas:

- TA D-84 landing
- Alaqua Point
- East Bay Point
- Wynnhaven Beach landing and staging area
- Range Road 259 and Range Road 253 road/bridge improvements

Management Requirements

General management requirements for floodplains include:

- Vehicles should remain on existing roads when crossing water bodies.
- Avoid digging near water bodies.
- Wastewater from field kitchens must be captured and disposed of properly; i.e. base wastewater plants or off base wastewater plants. Coordination with Mr. Martin, 96 CEG ((850) 882-6852) is required.
- Portable latrines would be placed at designated locations.
- Provided coordination is conducted, permits are acquired, and erosion control BMPs are employed for site improvements at LCAC landing sites, no adverse impacts to water quality at the site are anticipated.
- During grading, erosion control best management practices (BMPs) must be employed and coordination with AAC/EMSN and AAC/EMC during site improvements would ensure adherence to proper impact minimization procedures.
- Vessels of the armed forces will not release untreated bilge water within 12 nautical miles of shore.
- Eglin AFB requires that some types of graywater wastes generated on the land ranges or on Santa Rosa Island are subject to treatment. Wastewater from field kitchens will be contained and transported to on-base or off-base wastewater plants. Portable latrines will be provided at several locations. Field shower water is not an issue and collection is not required. Coordination with the 96 Civil Engineering Group at Eglin AFB will ensure that these requirements are met

5.9 AIR QUALITY

No air quality permits or modifications to existing air quality permits would be required. No management requirements are proposed.

5.10 HAZARDOUS MATERIALS/SOLID WASTE

5.10.1 IRP

No plans or permits are required.

Management Requirements

The Proponent will implement the following management requirements:

- Installation Restoration Program (IRP) areas SS-25 (Herbicide Test Grid), ST-259 (Water Tower No. 12511), and OT-25, OT-262, OT-264, and OT-271 (Cattle Dipping Vats) are located within Proposed Action locations. Coordination by AAC/EMR with FDEP and USEPA Region 4 is required if activities take place on active IRP sites.

5.10.2 Hazardous Materials/Waste

No plans or permits are required.

Management Requirements

The Proponent will implement the following management requirements:

- The storage, transport, and handling of hazardous material will be coordinated with AAC/EMCE, and these materials would be disposed of appropriately according to AAC Plan 32-5, Hazardous Waste Management Plan.
- Immediate response is required for petroleum, oil, and lubricant (POL) spills. Appropriate containment and clean-up actions, including on-base reporting requirements and disposal are required. POL products cannot be directed to sewer systems or impervious surfaces (such as grass). Spill response kits (pads and boons) will be made available during Rapid Ground Refueling activities.
- All spills and accidental discharges of petroleum, oils, lubricants, chemicals, hazardous waste or hazardous materials, regardless of the quantity, will be reported. A Spill Discharge Report must be filled out, and the responsible party must hand-carry or fax (882-3761 for Eglin, 884-2580 for Hurlburt) this Spill Report to AAC/EMC or 16 SOW CES/CEV, within four duty hours of the spill occurrence. Any spill that poses a threat to life, health, environment, or has the potential to cause a fire, will be reported to 96 CEG/CEF via 96 SFS by dialing 911. If the Fire Department declares an emergency condition, they may take control of the situation, including the tasking of the organization's clean-up detail. Spills over 25 gallons are required to be reported to the Florida Department of Environmental Protection (through AAC/EMC).

- Off-base notification of spills will be reported to Eglin Public Affairs Office (AAC/PA) at (850) 882-3931.
- Troops will pack out debris and refuse packed in or properly dispose of litter (FAC 62-701).
- Troops will remove and properly dispose of solid debris from blanks, chaff, smokes, and flares in accordance with Eglin operating procedures.
- Brass casings will be collected for recycling, as practicable.
- Troops will be restricted on foot from sensitive sites (FNAI, Tier I) most susceptible to impact when non-sensitive sites may be used as an alternative.
- A post-mission survey will be conducted to ensure debris has been removed.
- The Proponent will comply with AAC Plan 32-9 Hazardous Materials Management.

5.11 SENSITIVE SPECIES

Plans

No plans are required.

Permits

An ESA Section 7 consultation with the U.S. Fish and Wildlife Service regarding ARG/MEU activities has been completed for all federally endangered species associated with Eglin AFB.

5.11.1 Okaloosa Darter

Management Requirements

Avoidance and minimization procedures that will be employed to minimize impacts to the Okaloosa darter from ground movement associated with MEU training include:

- Vehicles will use established roads, trails, and bridges near Okaloosa darter streams.
- Vehicles and troops avoid activities such as driving and digging on steep slopes near Okaloosa darter streams and in newly restored areas adjacent to Okaloosa darter streams.
- Ground disturbance is minimized near Okaloosa darter streams.
- Operations are conducted in accordance with guidelines in the Range Road Maintenance Handbook and the Test Area Maintenance PEA.
- Pyrotechnics use will follow Eglin's Wildfire Specific Action Guide Restrictions.

5.11.2 Flatwoods Salamander

Management Requirements

Avoidance and minimization procedures that will be employed to minimize impacts to the flatwoods salamander from ground movement associated with MEU training include:

- Activities will be restricted in isolated wetlands and within good condition primary buffers.
- When it is impossible to avoid flatwoods salamander habitat, impacts will be confined to poor buffer habitat versus high quality buffer habitat (as identified by AAC/EMSN).
- Mounding of materials on sides of the road will be avoided.
- The RR 259 tank trail will be constructed on the east side of the road near flatwoods salamander habitat to minimize impacts.
- For road improvement/construction activities along RR 259, RR 668, RR 666, and RR 253, BMPs outlined in Range Road Maintenance Handbook will be employed.
- South of the East Bay River, large troop movements will be restricted to established road surfaces.
- Pyrotechnics use will follow Eglin's Wildfire Specific Action Guide Restrictions.

5.11.3 RCW

Management Requirements

Avoidance and minimization procedures that will be employed to minimize impacts to the RCW from ground movement associated with MEU training include:

- No digging/excavating or bivouacking within 200 feet of identified active RCW cavity trees.
- Only transient foot traffic and vehicle traffic on established trails/roads are allowed within 200 feet of identified active RCW cavity trees.
- 60 and 81 mm mortars will only be fired at a distance greater than 656 feet (200 meters) from any identified active RCW cavity tree.
- Firing of the 155 mm Howitzer on TA C-72 will be conducted at least 1,000 feet from the southeast boundary.
- Pyrotechnics use will follow Eglin's Wildfire Specific Action Guide Restrictions.

5.11.4 Sea Turtles

Management Requirements

Avoidance and minimization procedures that will be employed to minimize impacts to the sea turtles from ground movement associated with MEU training include:

- The size of vehicular movement corridors will be limited to the minimum necessary for the mission. Lateral movement along the beachfront will only occur between test sites A-15 and A-11A, as close to the waterline as possible and at least 50 feet below the primary dune line.

- Proposed landing corridors will be marked so as to be easily distinguished by the operators of amphibious landing vehicles/craft.
- To protect sea turtle nesting habitat within movement corridors, all vehicles and troops will avoid all dunes over 5 feet in height.
- All nests that are laid within crossover and access corridors (A-13B, A-11A, and A-10) will be relocated laterally along the primary dune line to a site at least 50 feet away from all vehicular movement corridors.
- Nests occurring less than 50 feet above the water line between A-13B and A-11A, will be relocated northward to the toe of the nearest primary dune.
- Nests occurring between A-13B and A-11A, where MHW is less than 50 feet from the primary dune line will be relocated to the primary dune line where MHW is at least 50 feet away.
- All known sea turtle nests will be marked and protected in accordance with established Eglin Natural Resources Branch protocol. An additional 10-foot boundary will be marked around all nests occurring within proposed action area (see Figure A-39) using infrared tape.
- Movement corridors will be surveyed immediately prior to all nighttime operations on the beachfront.
- During nighttime operations, a surveyor will be posted by all nests beyond 50 days of incubation that are less than 0.5 miles from the area of activity.
- To the extent practicable, vehicles and watercraft will be staged at water's edge. Whenever it is necessary to stage vehicles on the beachfront, silt screens will be installed around the base of the vehicles, or a surveyor will be stationed near vehicles to watch for nesting females.
- All ruts deeper than two inches created during daytime operations will be removed before sunset. All such ruts created during night operations will be removed immediately following the operation completion.
- When MEU ground movements on SRI occur between 1 May and 1 September, sea turtle surveys will be conducted every morning in accordance with established Index Nesting Beach Survey (INBS) and Eglin Natural Resources Branch protocol.
- Sea turtles have been associated with drifting Sargassum. Large mats of Sargassum will be avoided during the day to minimize potential impacts.
- Nest relocation, proposed as a minimization measure for ARG/MEU beach landings, will move nests outside of the operation area, potentially reducing the number of hatchlings in the transit area.

5.12 SENSITIVE HABITATS

No plans are required.

Permits

A Section 7 Consultation has been completed to assess the potential impacts to piping plover and Gulf sturgeon critical habitat.

Management Requirements for Seagrass

The Proponent will implement the following management requirements:

- Seagrass beds would be avoided as necessary as a management requirement. Surveys of the Wynnhaven Beach landing site would be completed prior to the initiation of MEU Training.

5.13 CULTURAL RESOURCES

Plans

A Memorandum of Agreement between Eglin AFB, Marine Corps, and Florida SHPO describing adverse effects and corresponding mitigative measures was completed in April 2003. The MOA, addresses adverse effects associated with proposed activities at each site and identifies the steps that must be taken by specific parties to mitigate or avoid adverse effects.

A data recovery plan will be developed prior to each data recovery project in consultation with the SHPO.

Permits

No cultural resources permits are required.

Management Requirements

- Archaeological sites will be avoided where possible by constructing barriers such as fences or marking sites in the field and on maps.
- When avoidance of sites is not feasible, mitigation strategies will be developed in consultation with the Florida SHPO.
- Troops will be instructed to avoid high probability zones during ground movements.
- Where high probability zones must be utilized, steep slopes near streams, eroded banks, soft sands, or other vulnerable areas will be avoided.
- Areas where artifacts can be seen on the ground will be avoided. Artifacts include any man-made object, including glass, nails, bricks, ceramics, arrowheads, metal, and structures such as fence posts and bridge remnants.
- Troops will be instructed to not collect, damage, or move artifacts from their original location.

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APPENDIX A

MEU TRAINING ACTIVITY LOCATIONS

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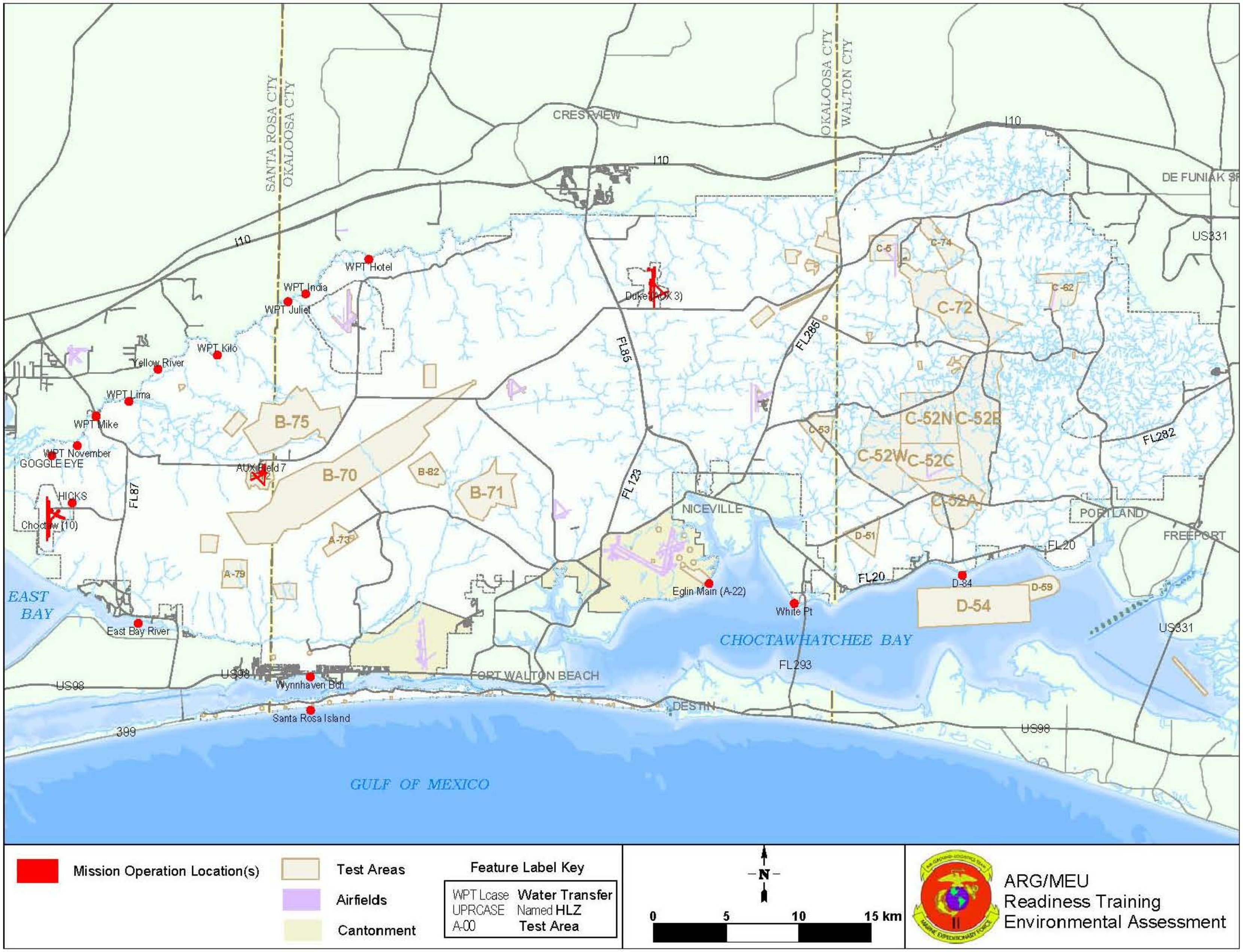

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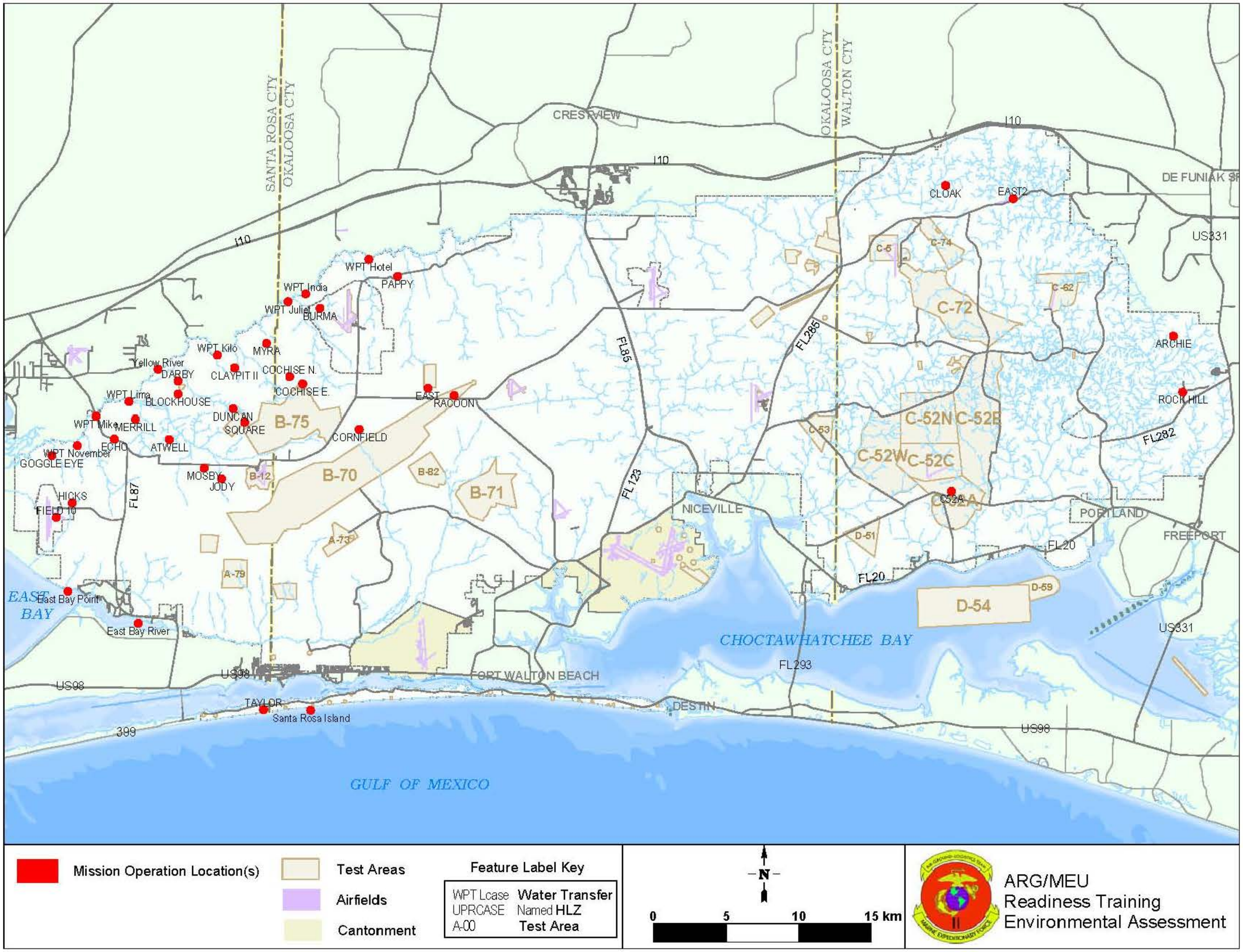

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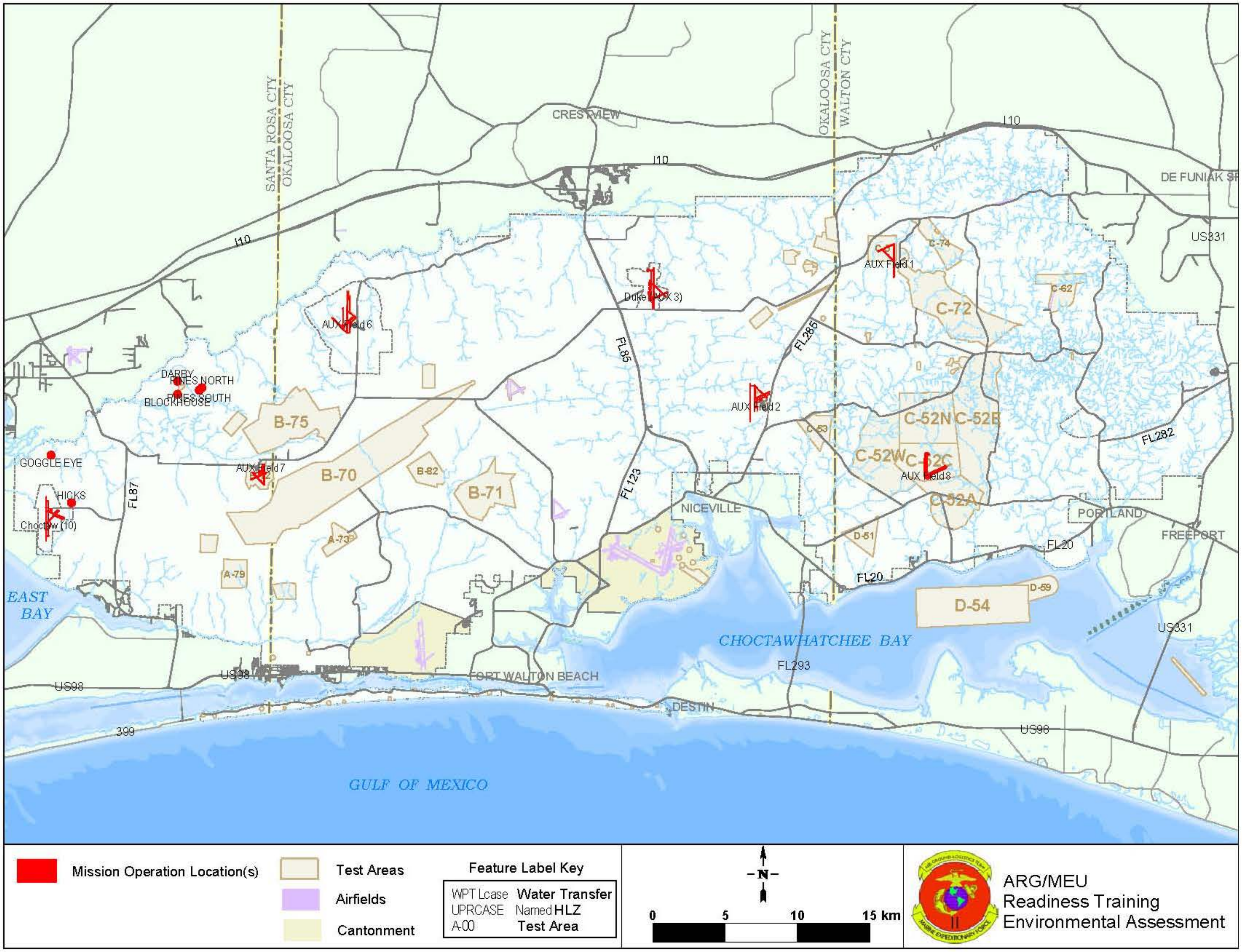

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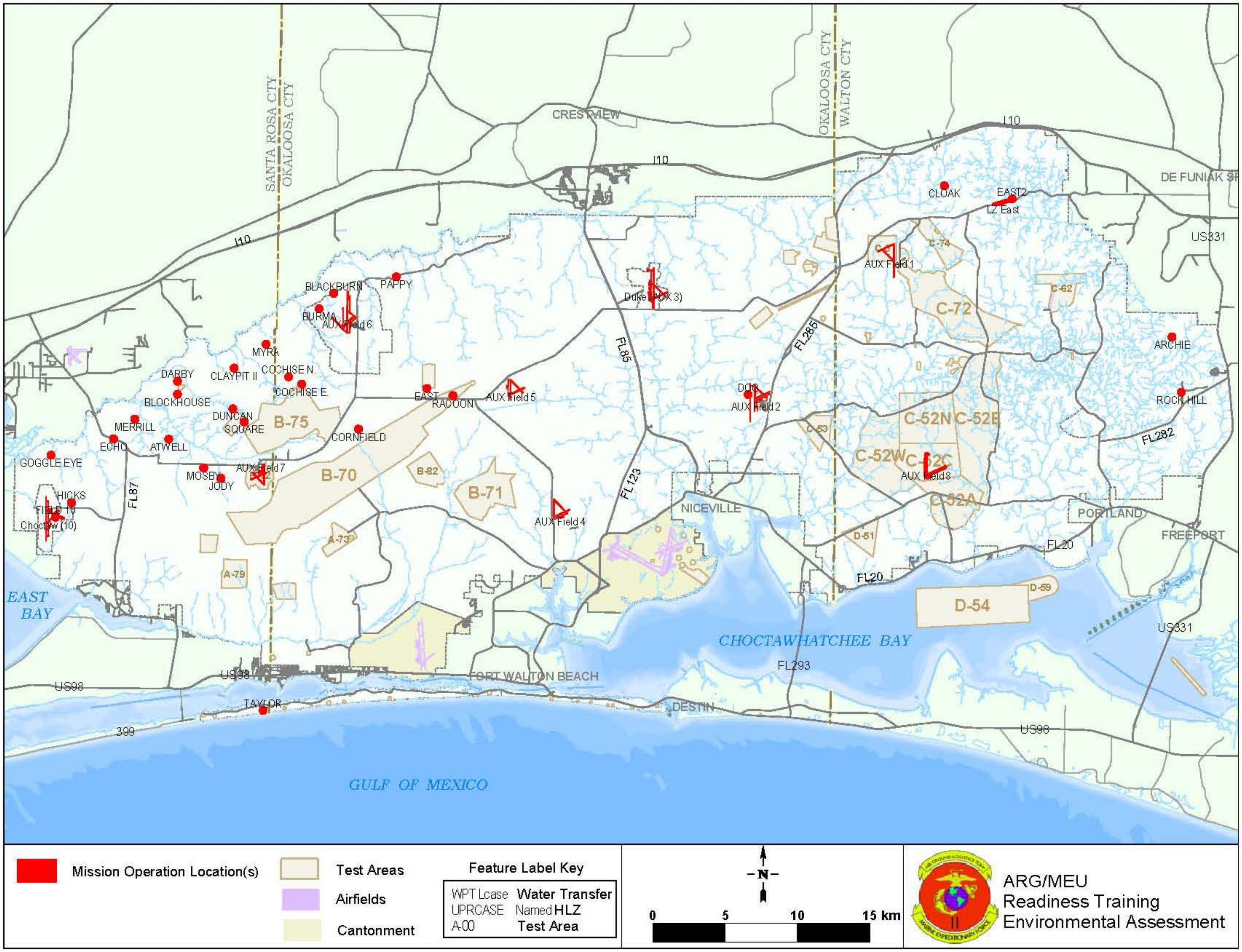

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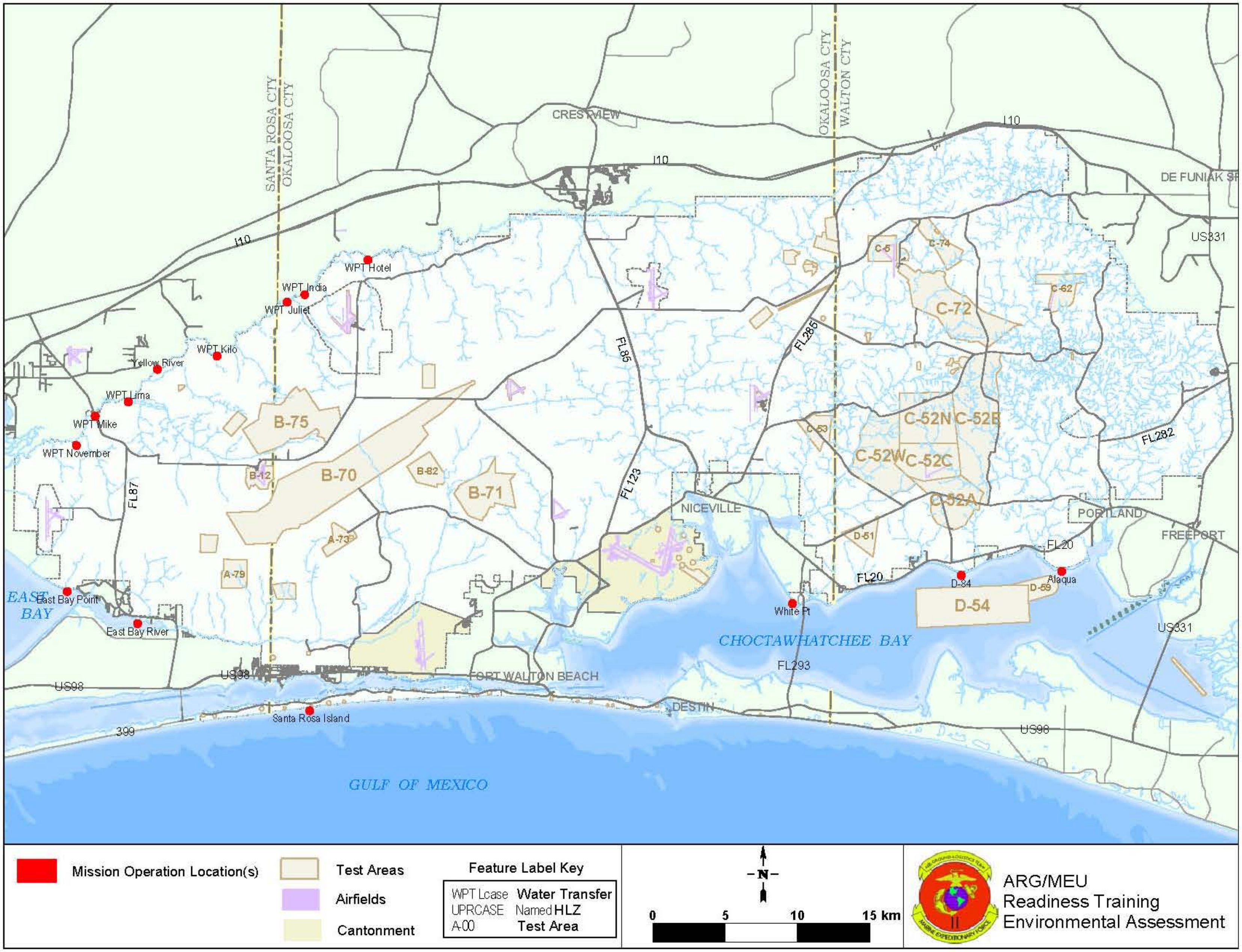

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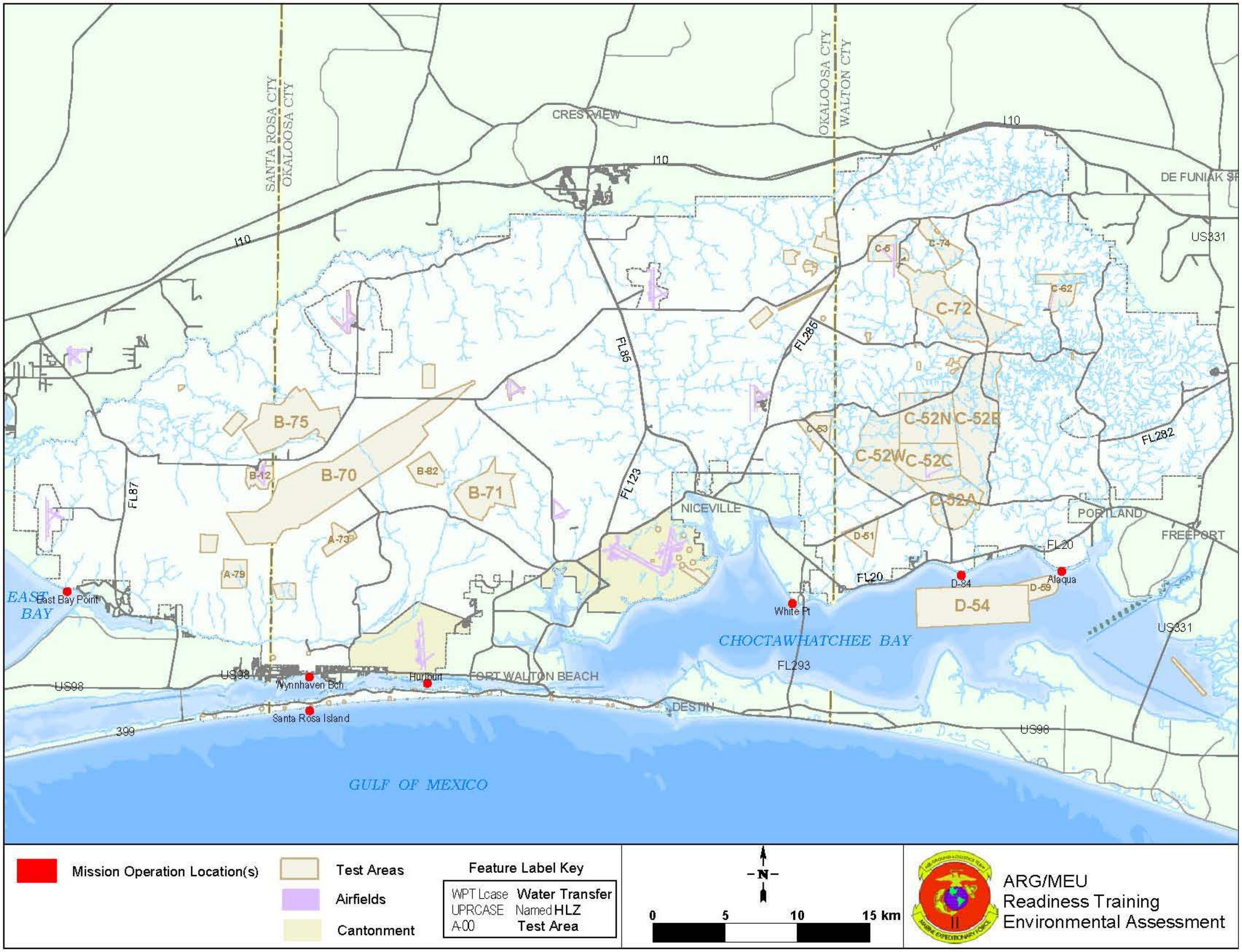

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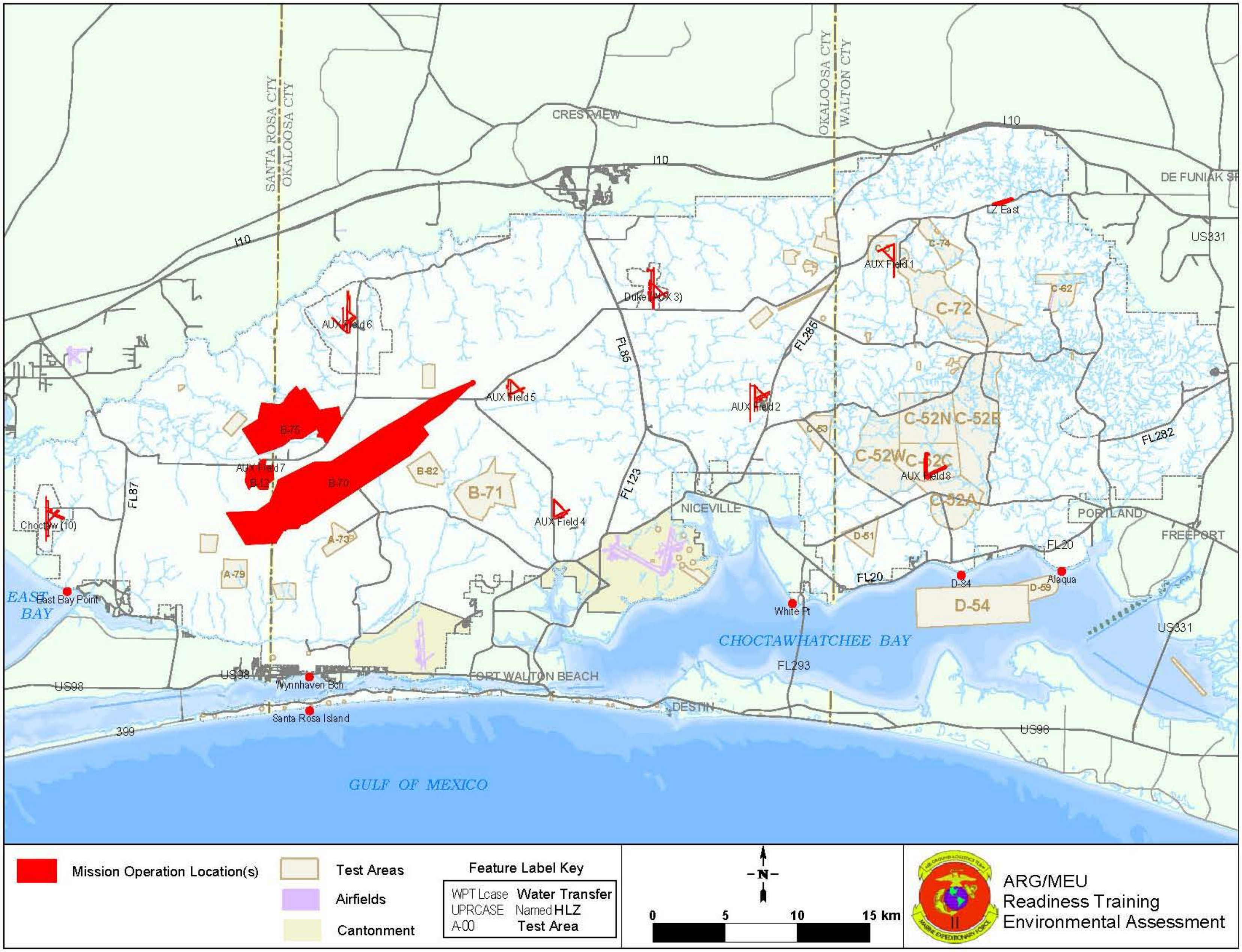

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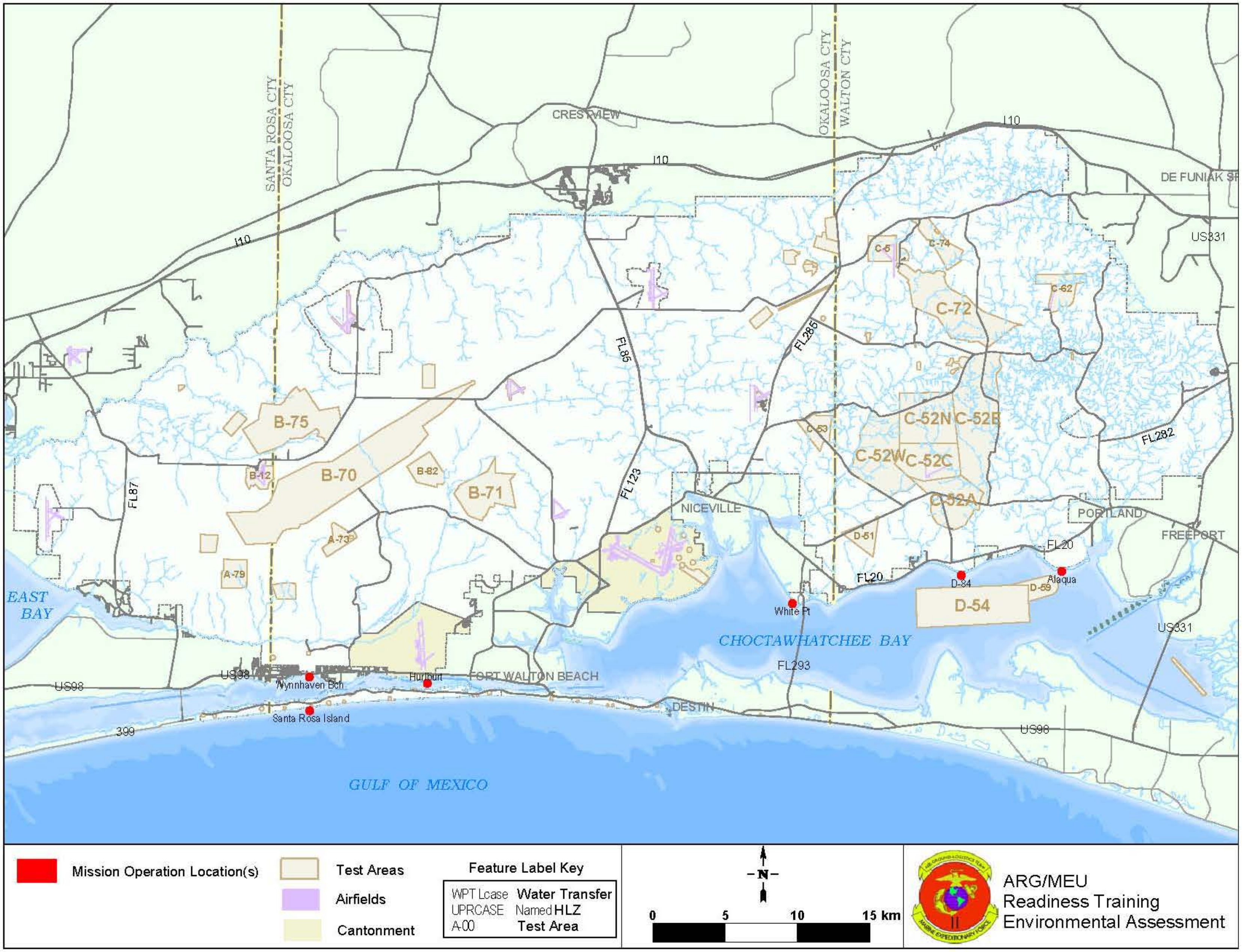

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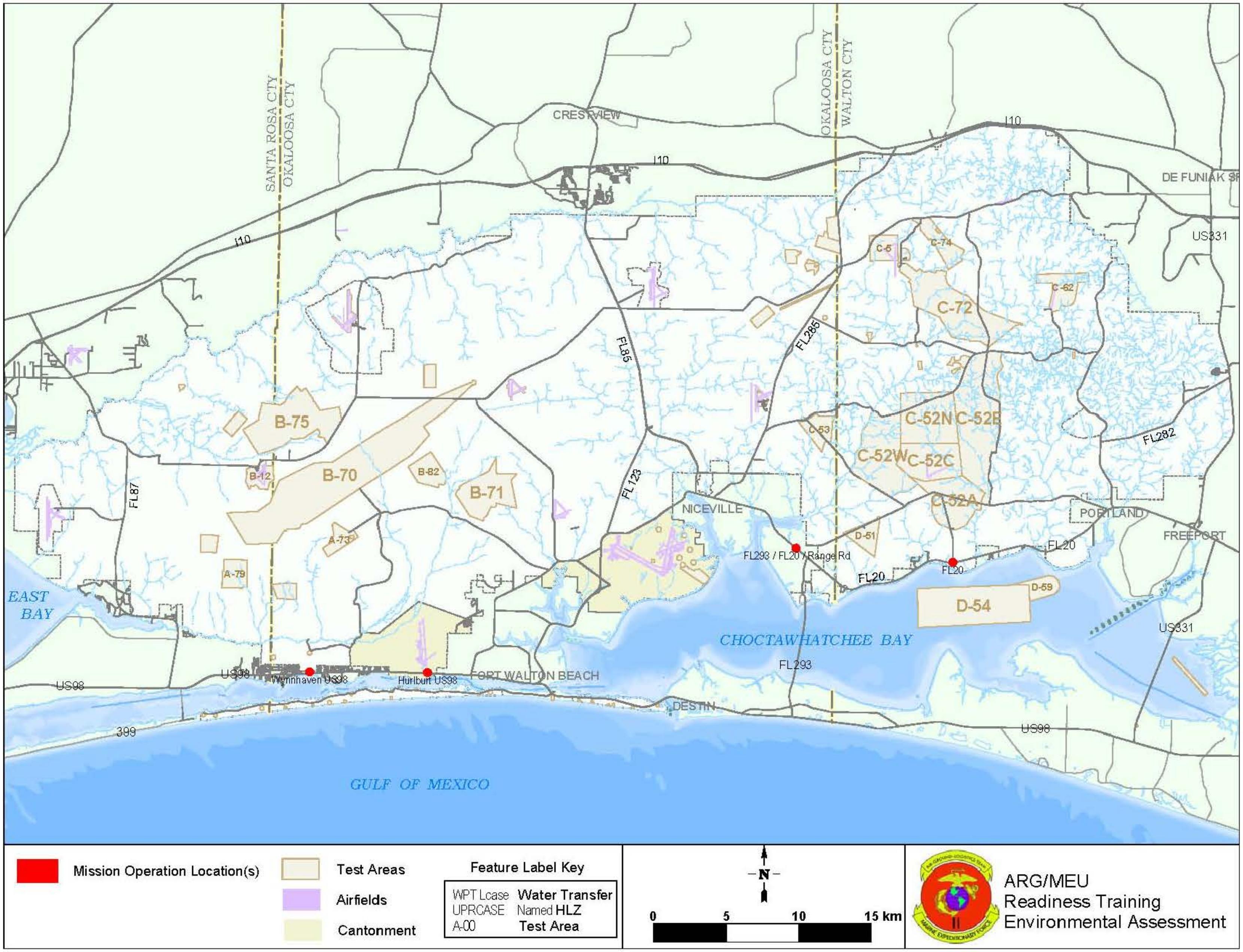

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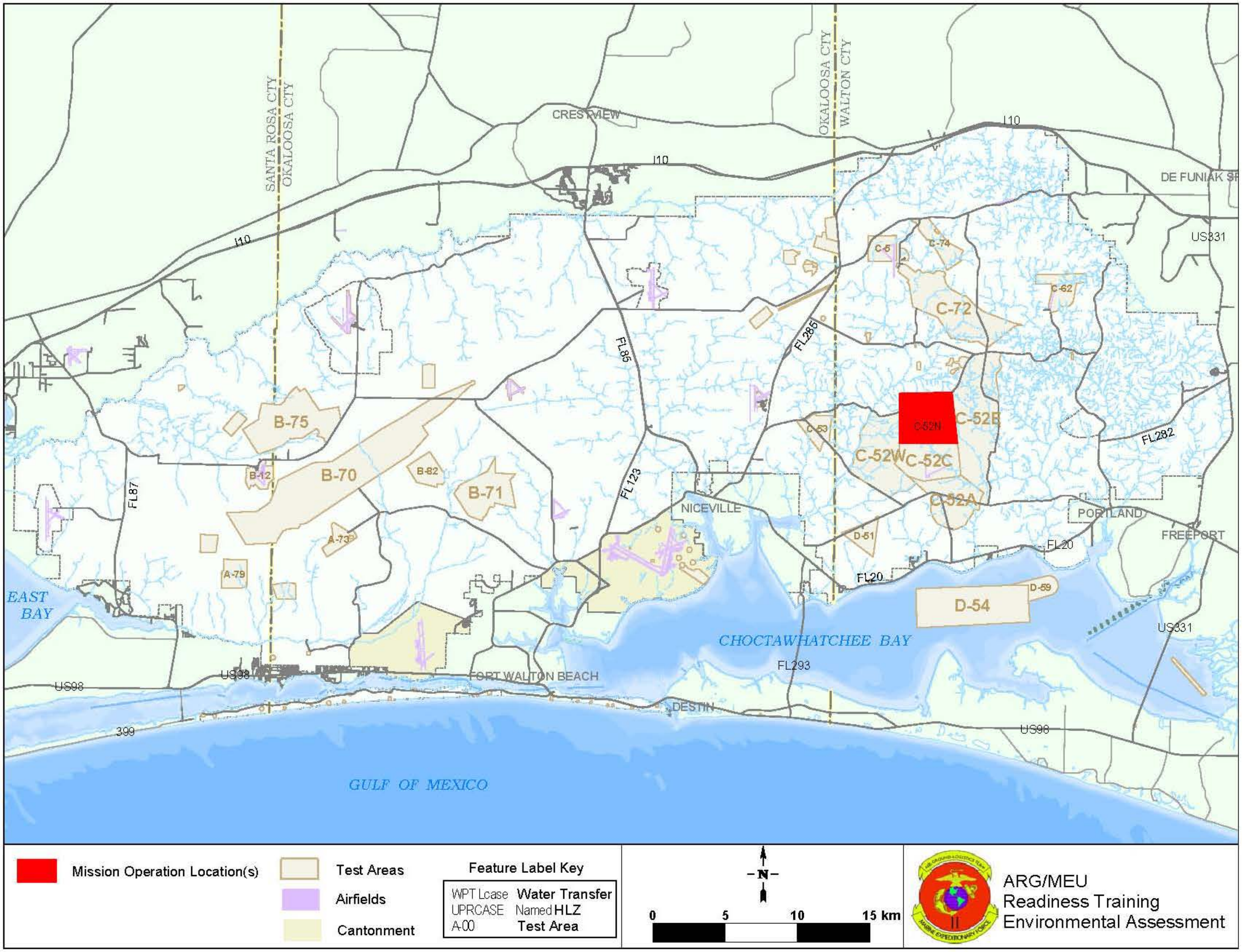

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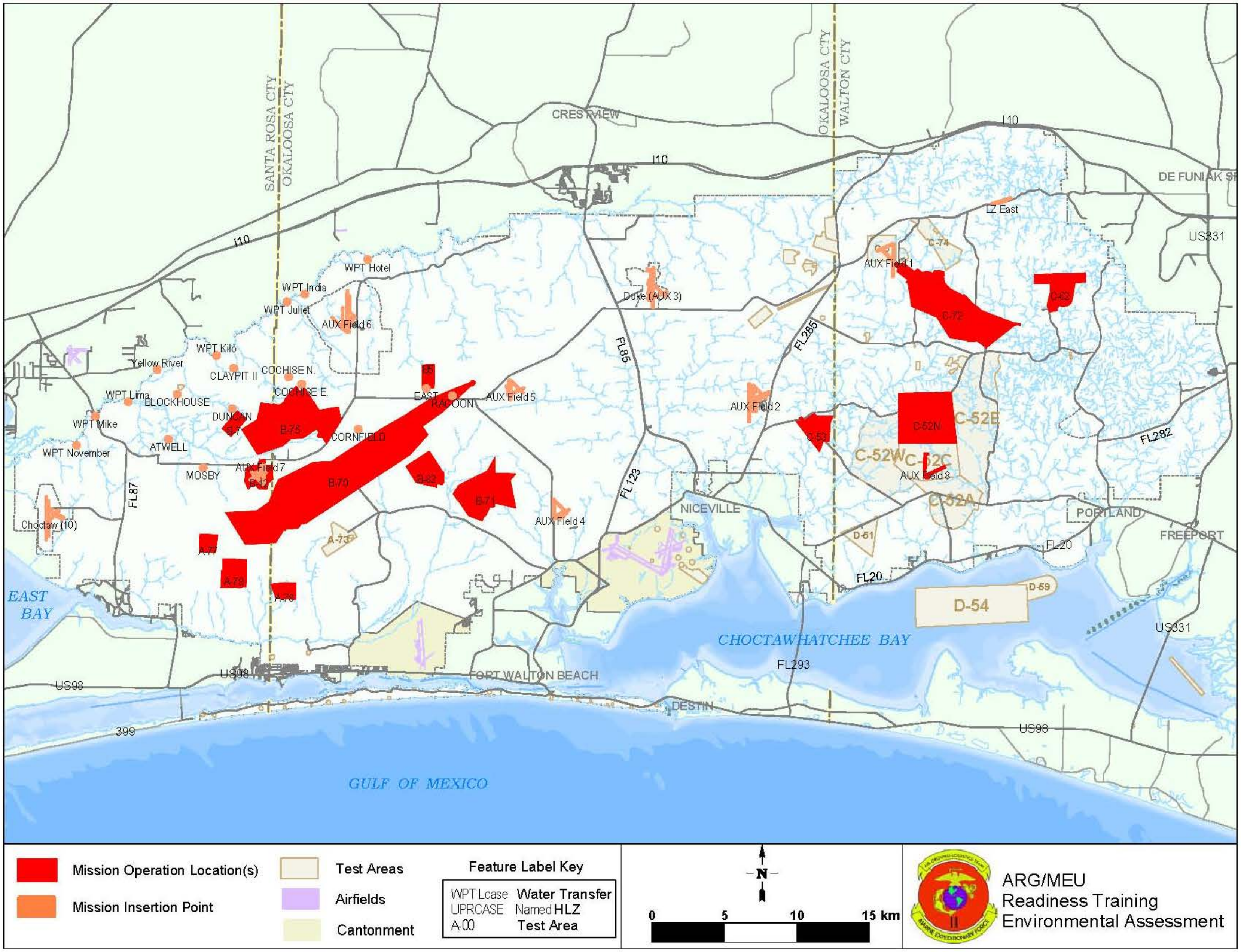

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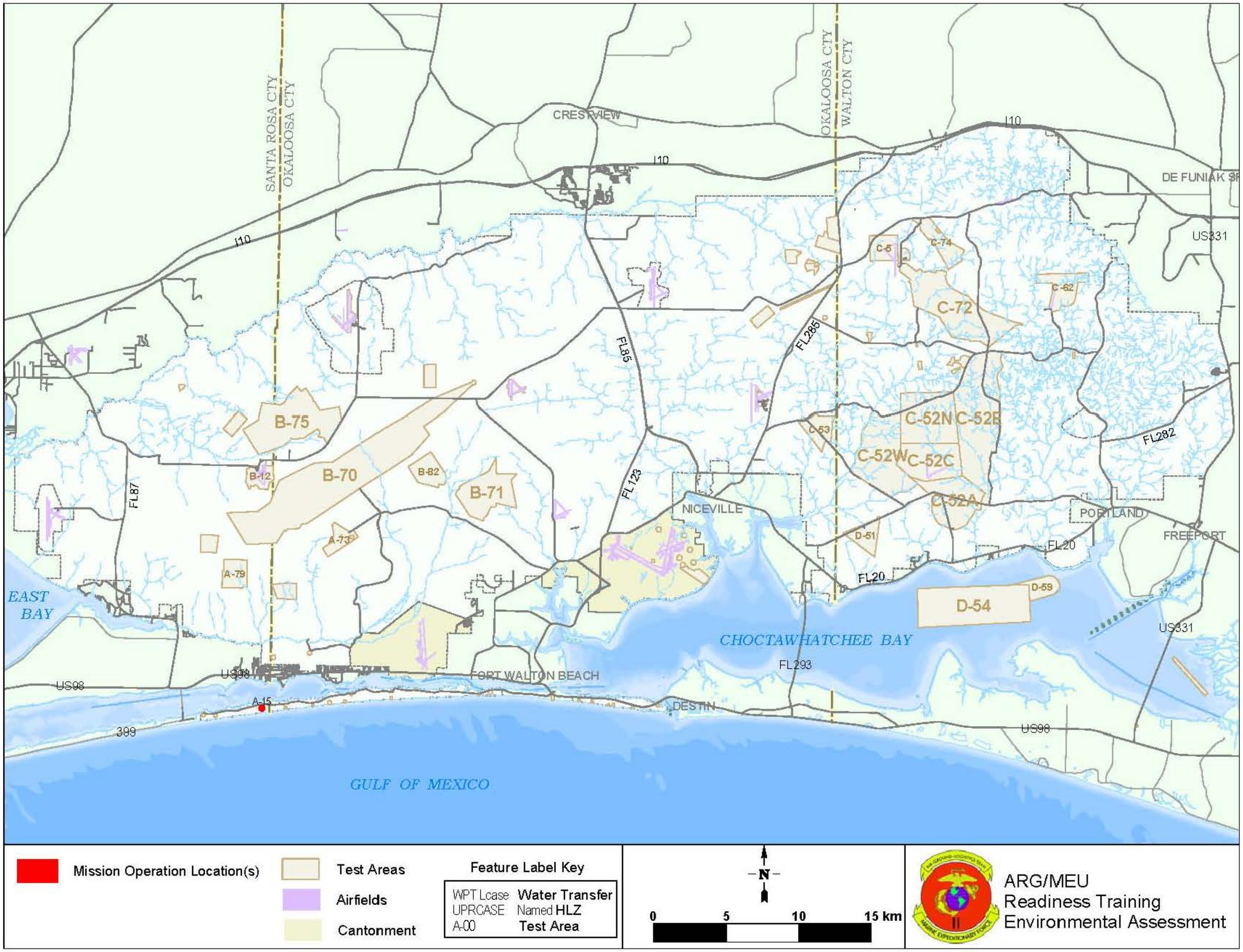

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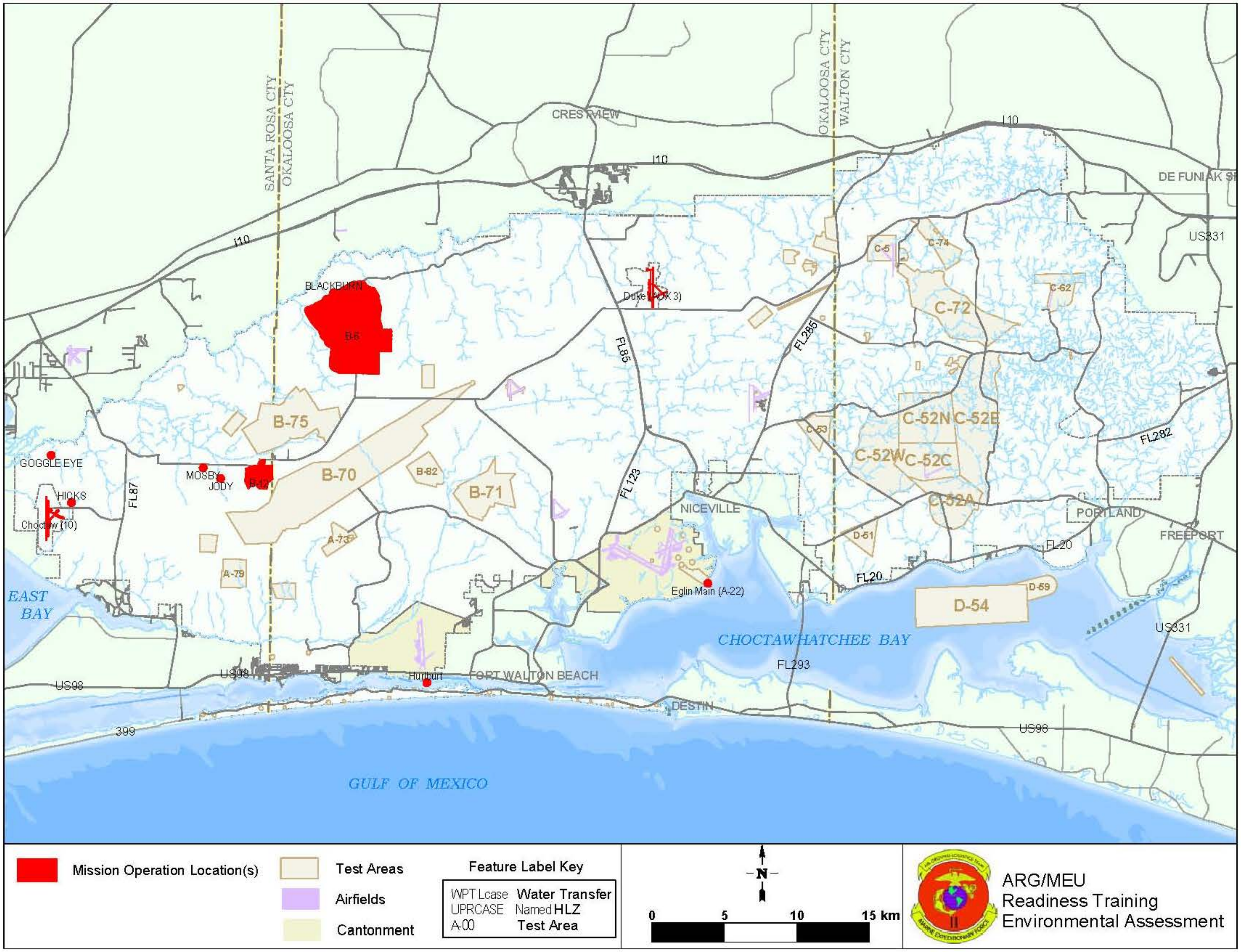

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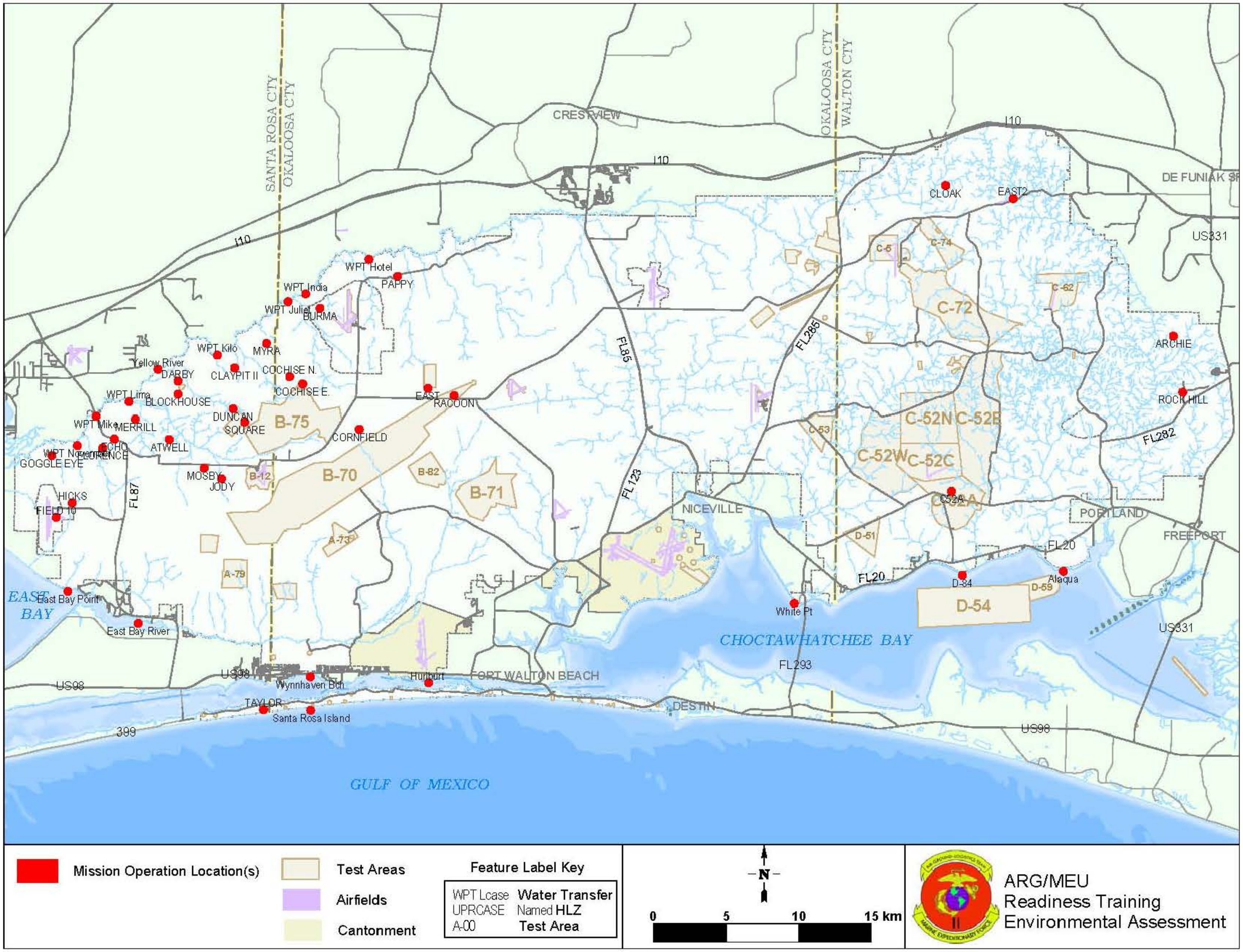

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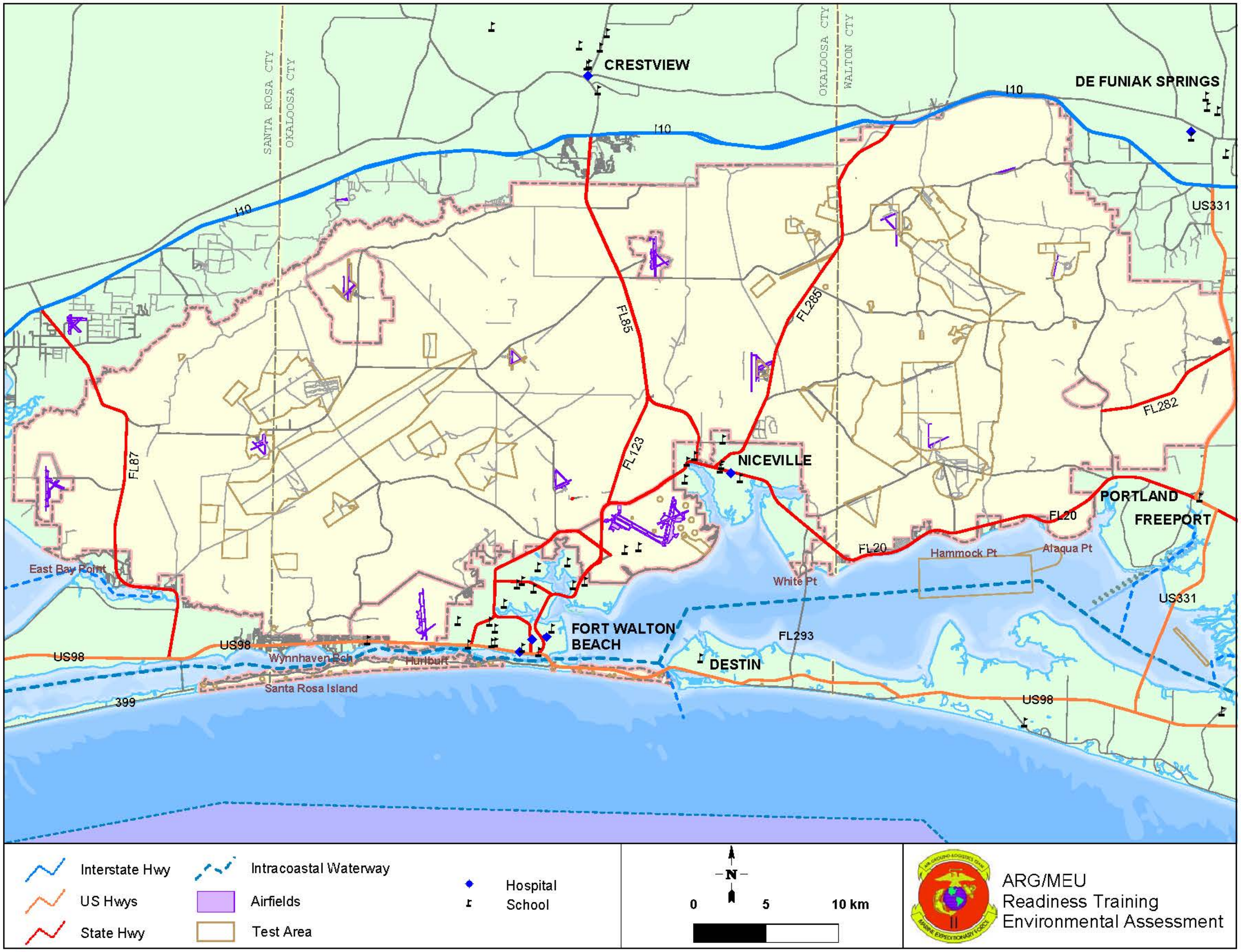

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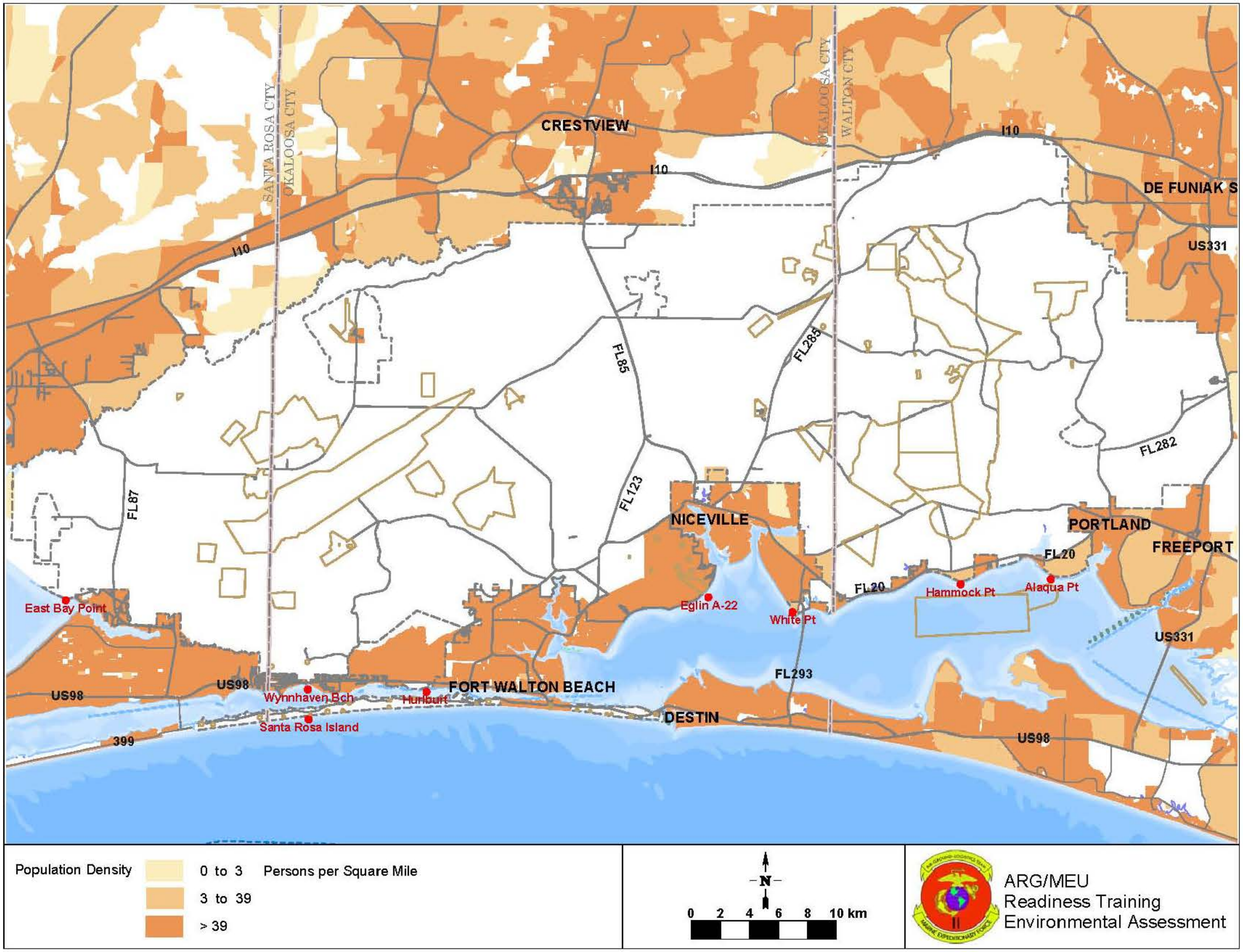

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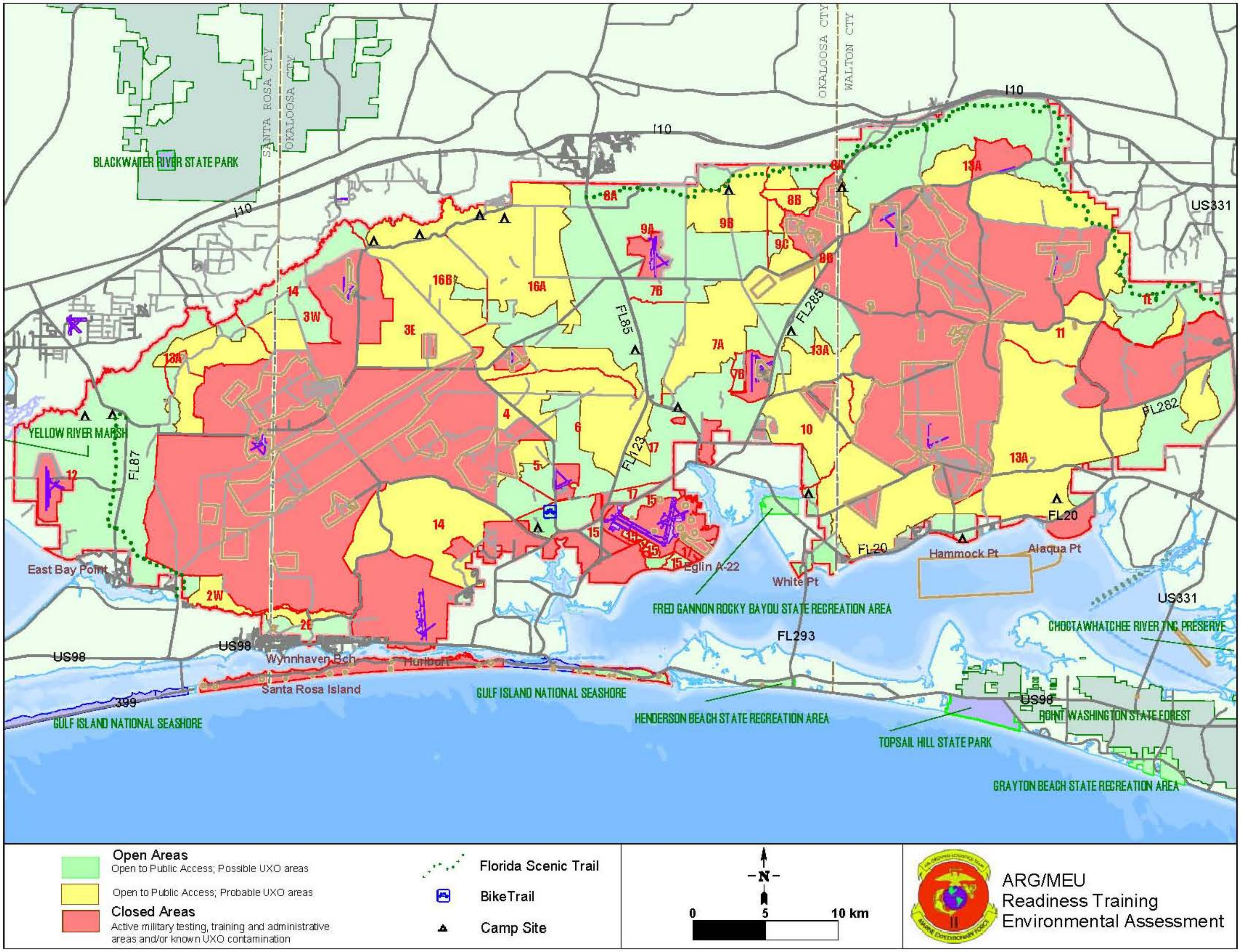

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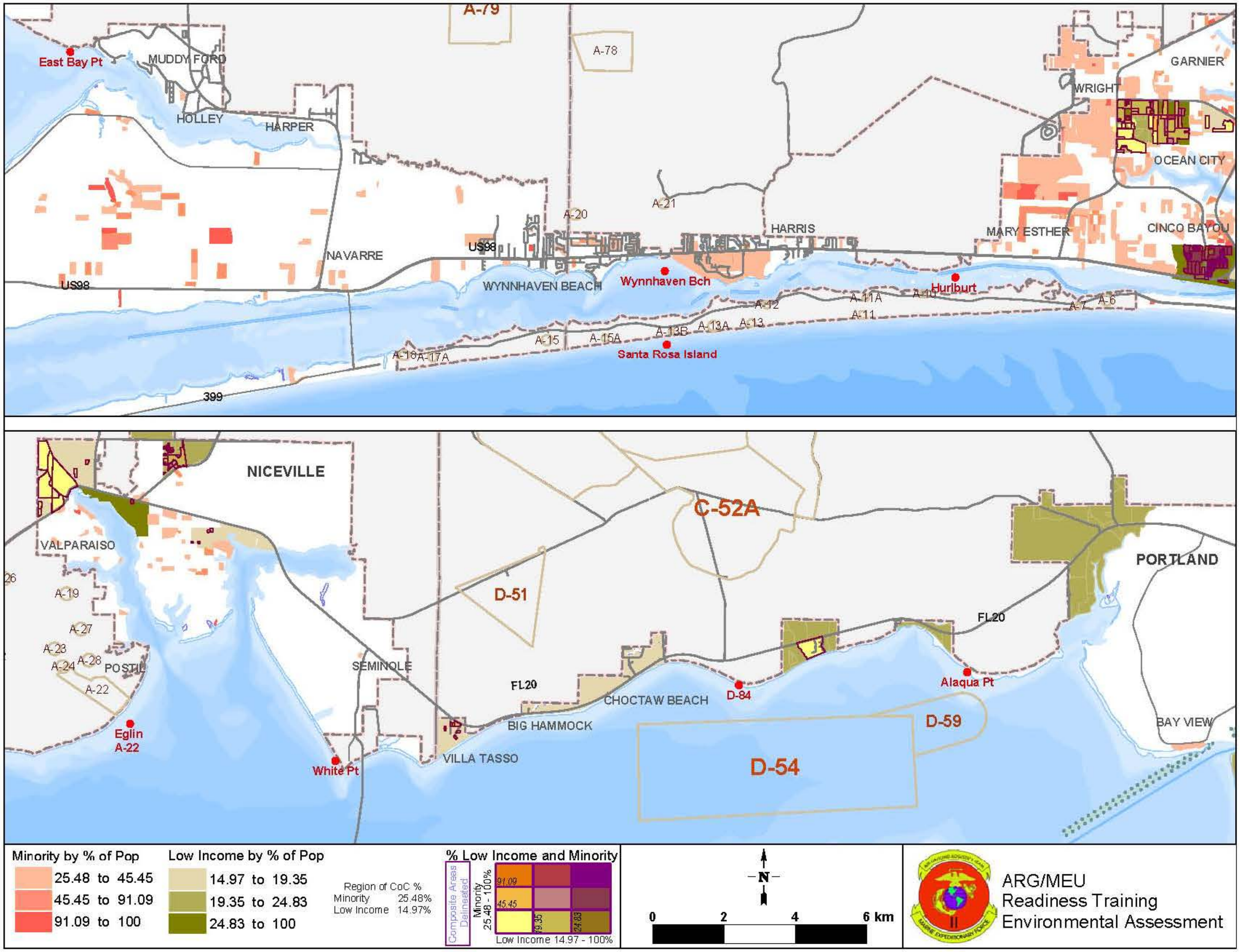

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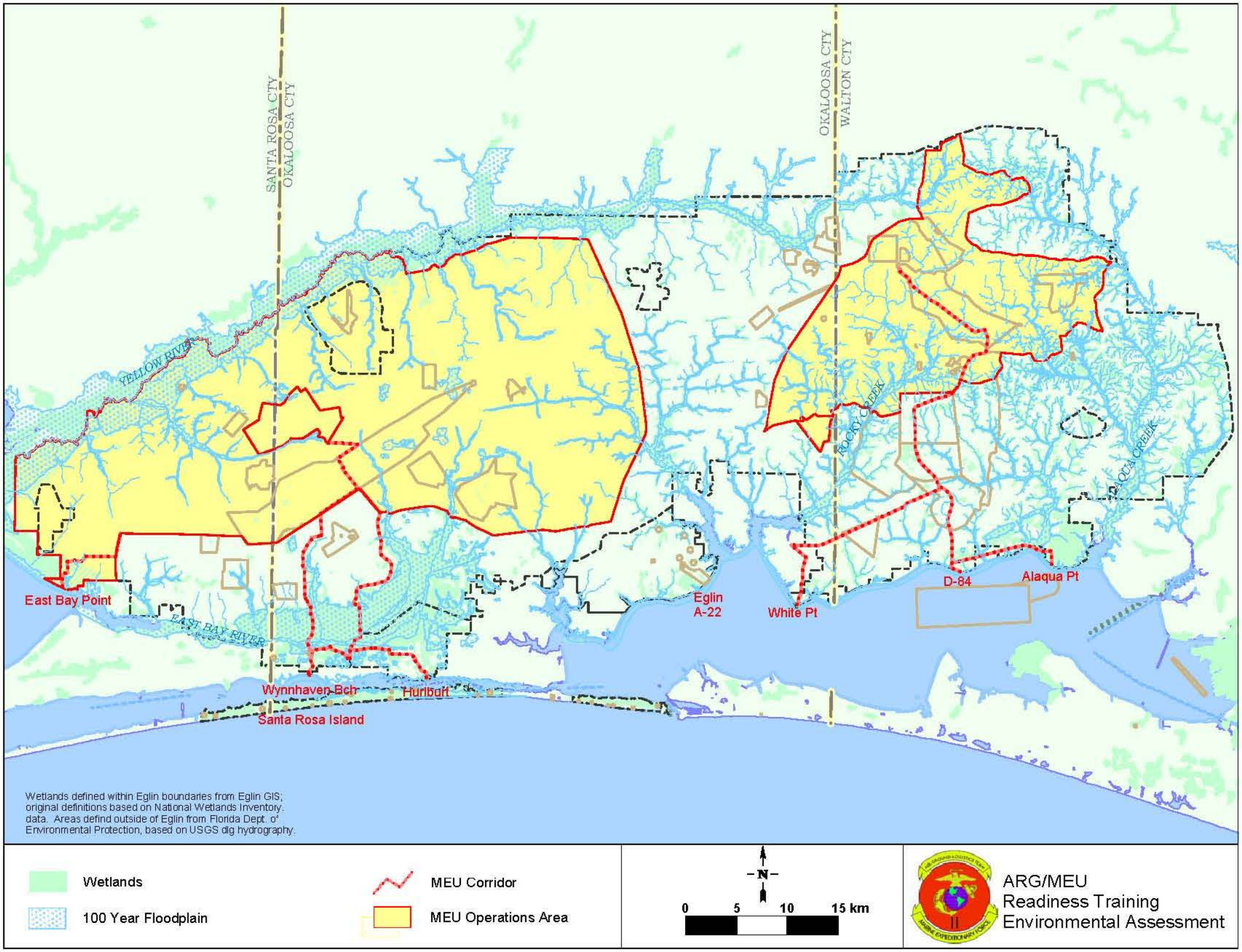

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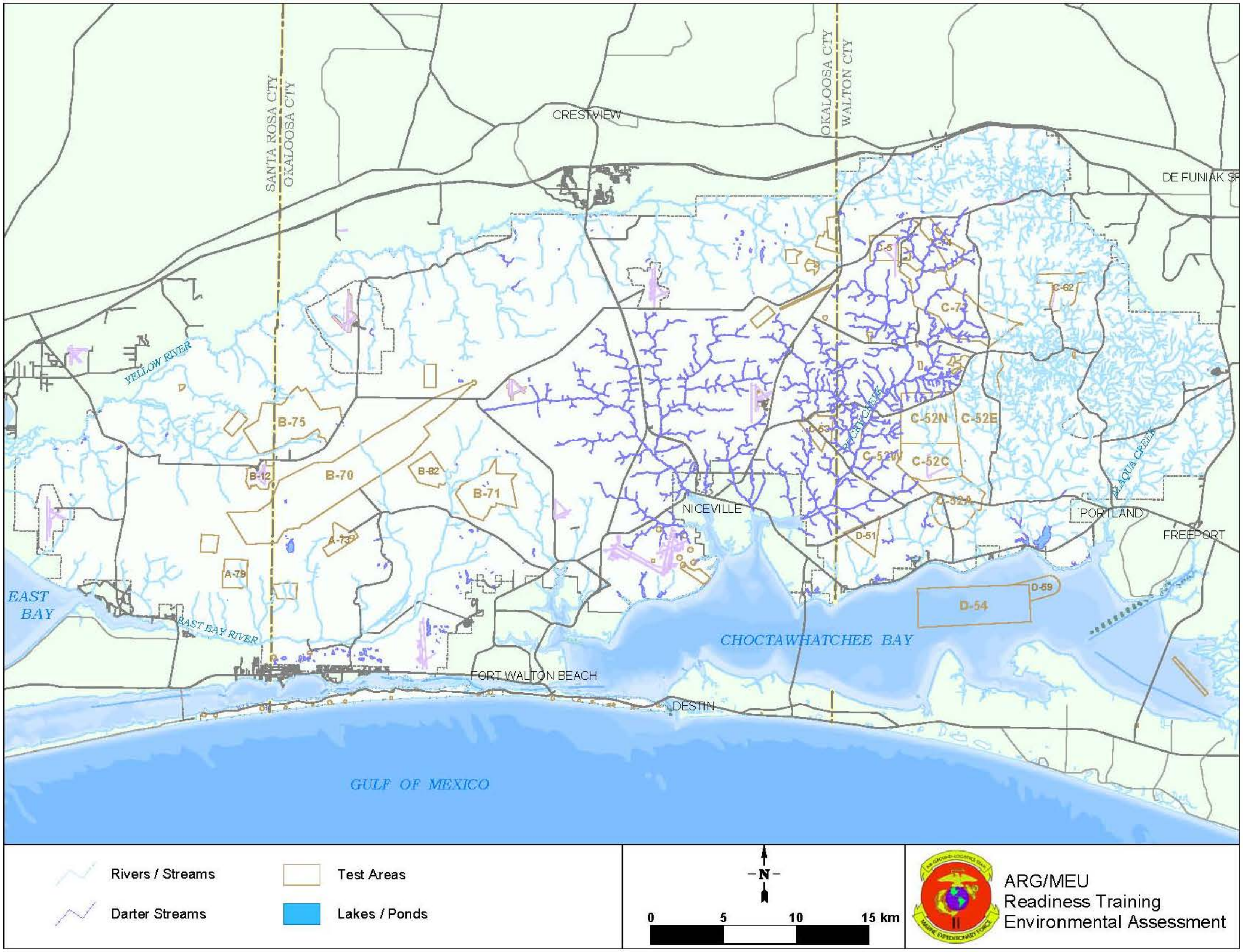

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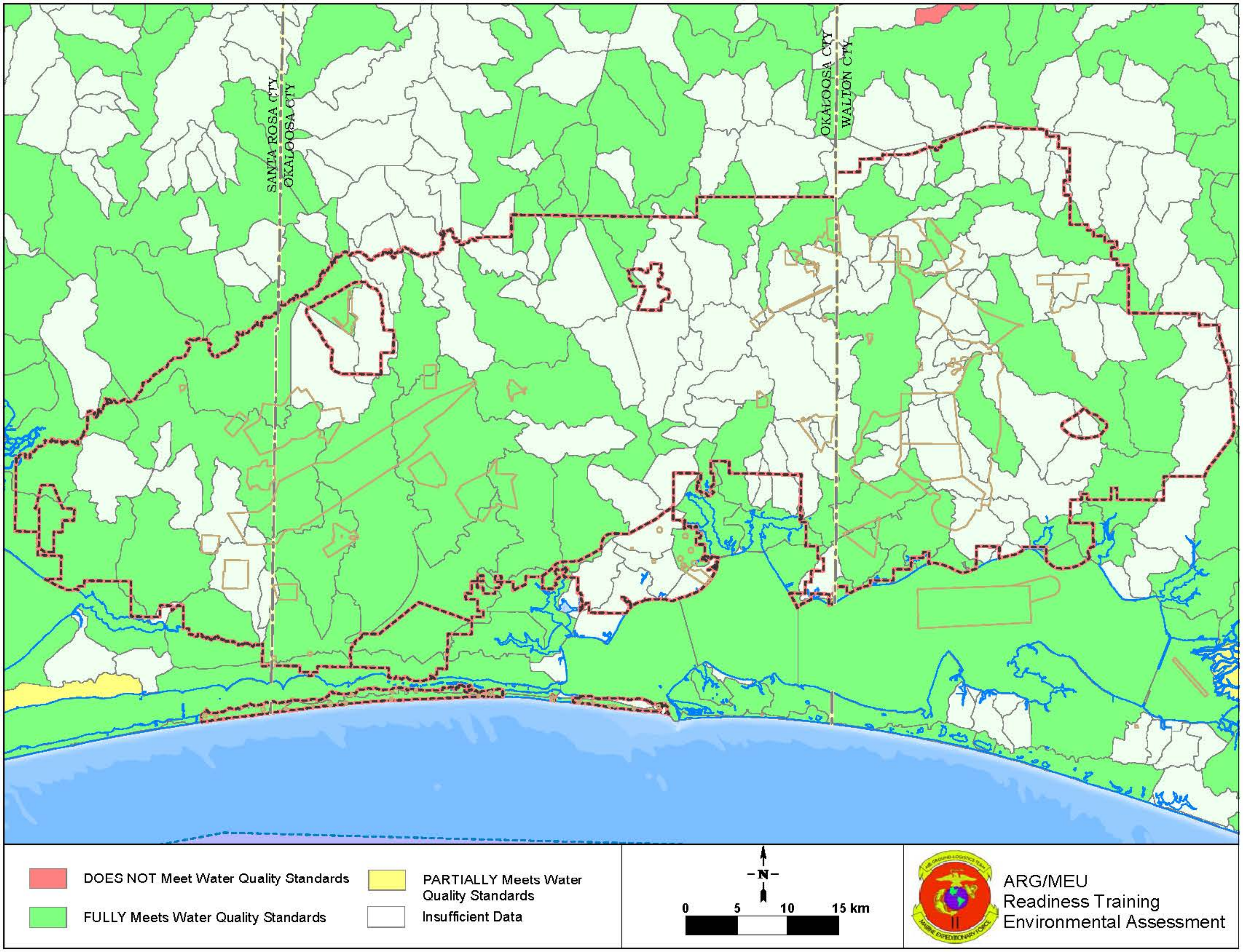

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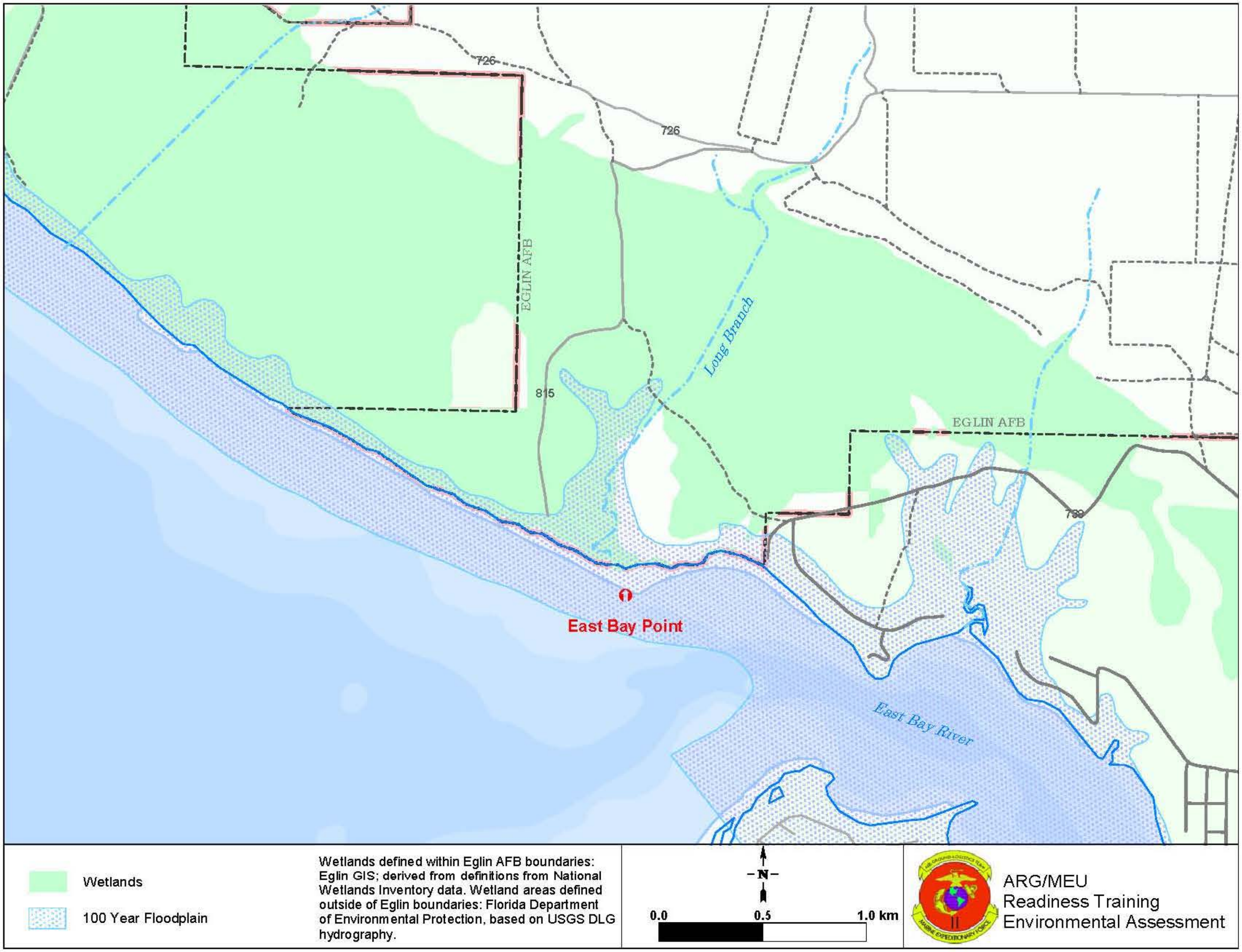

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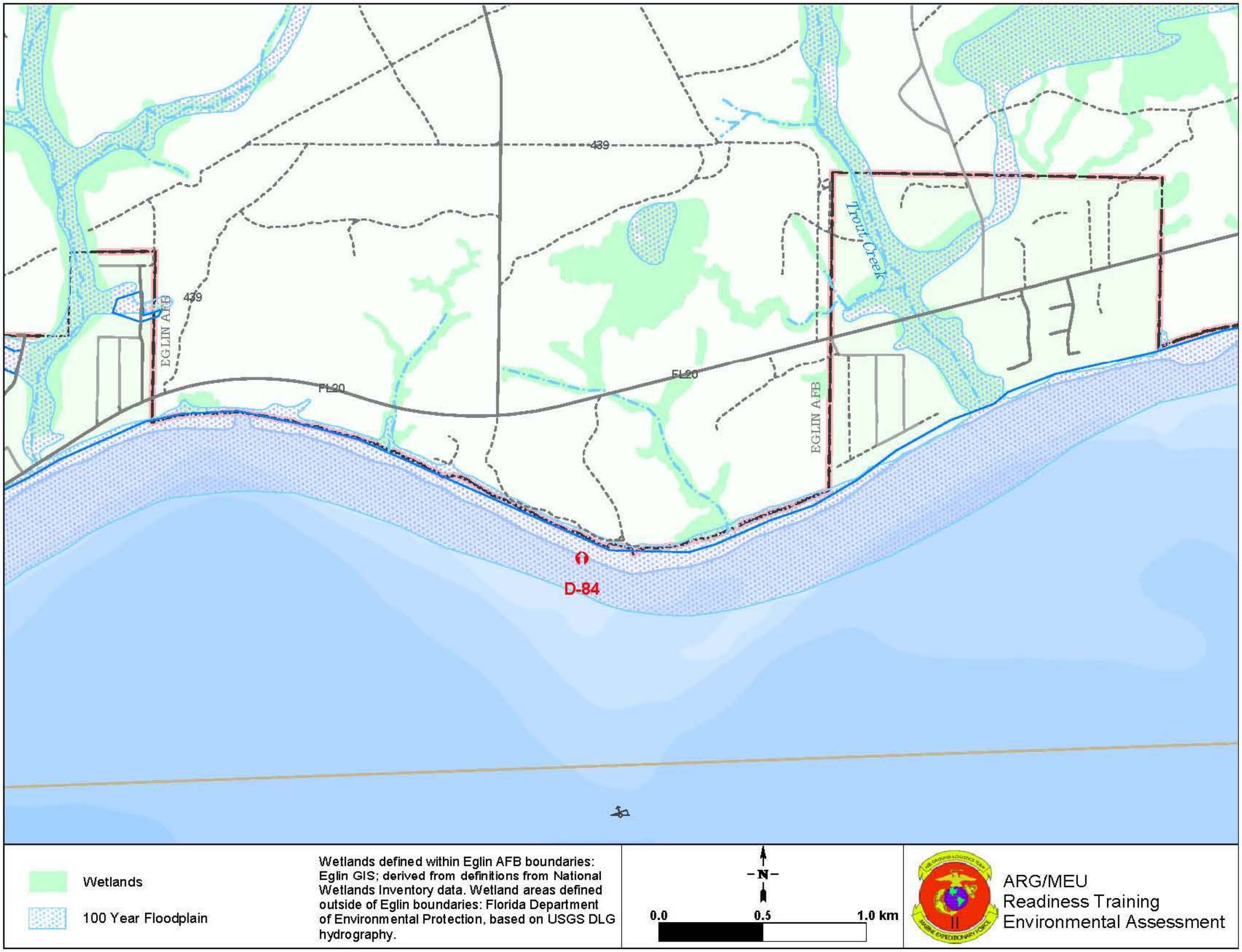

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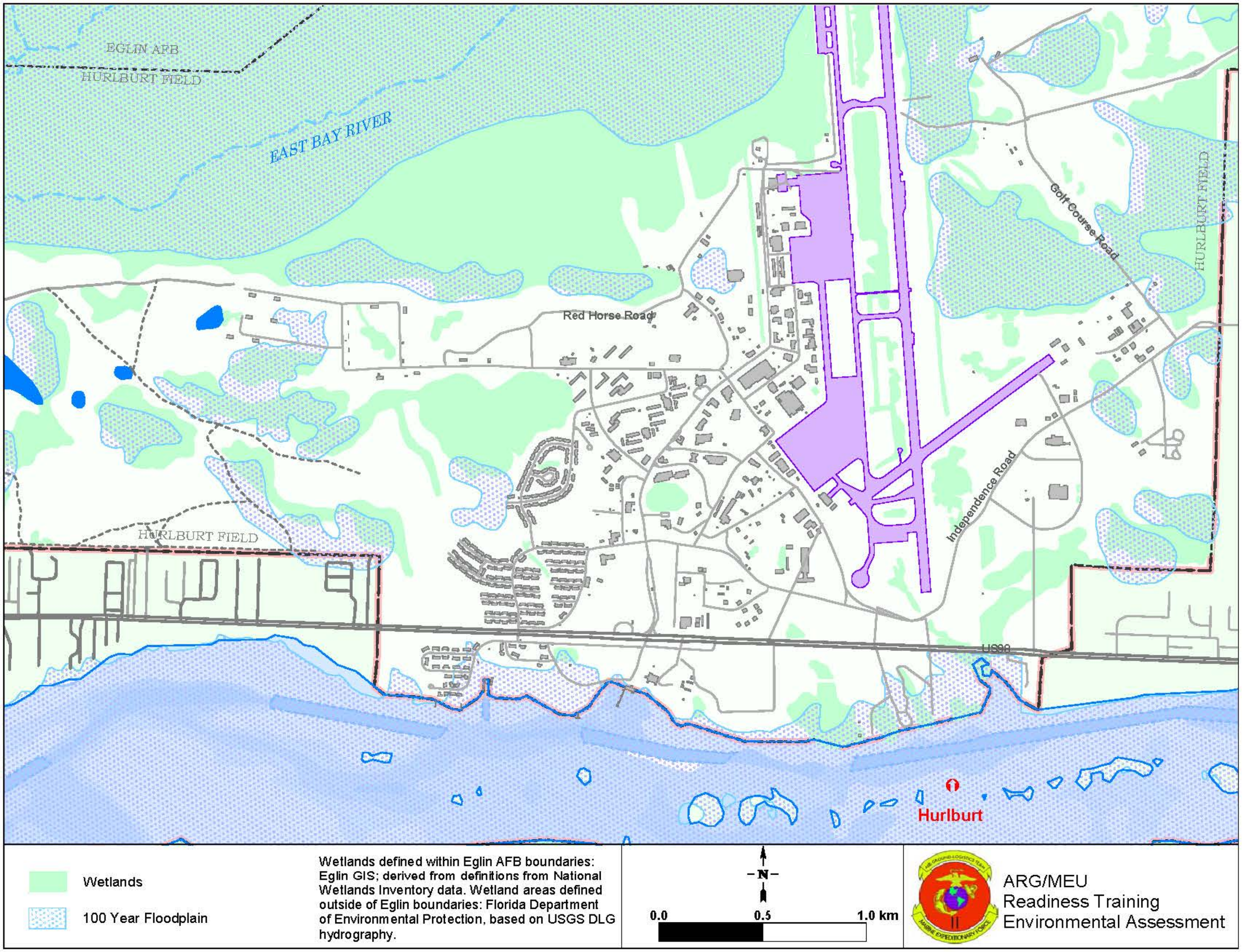

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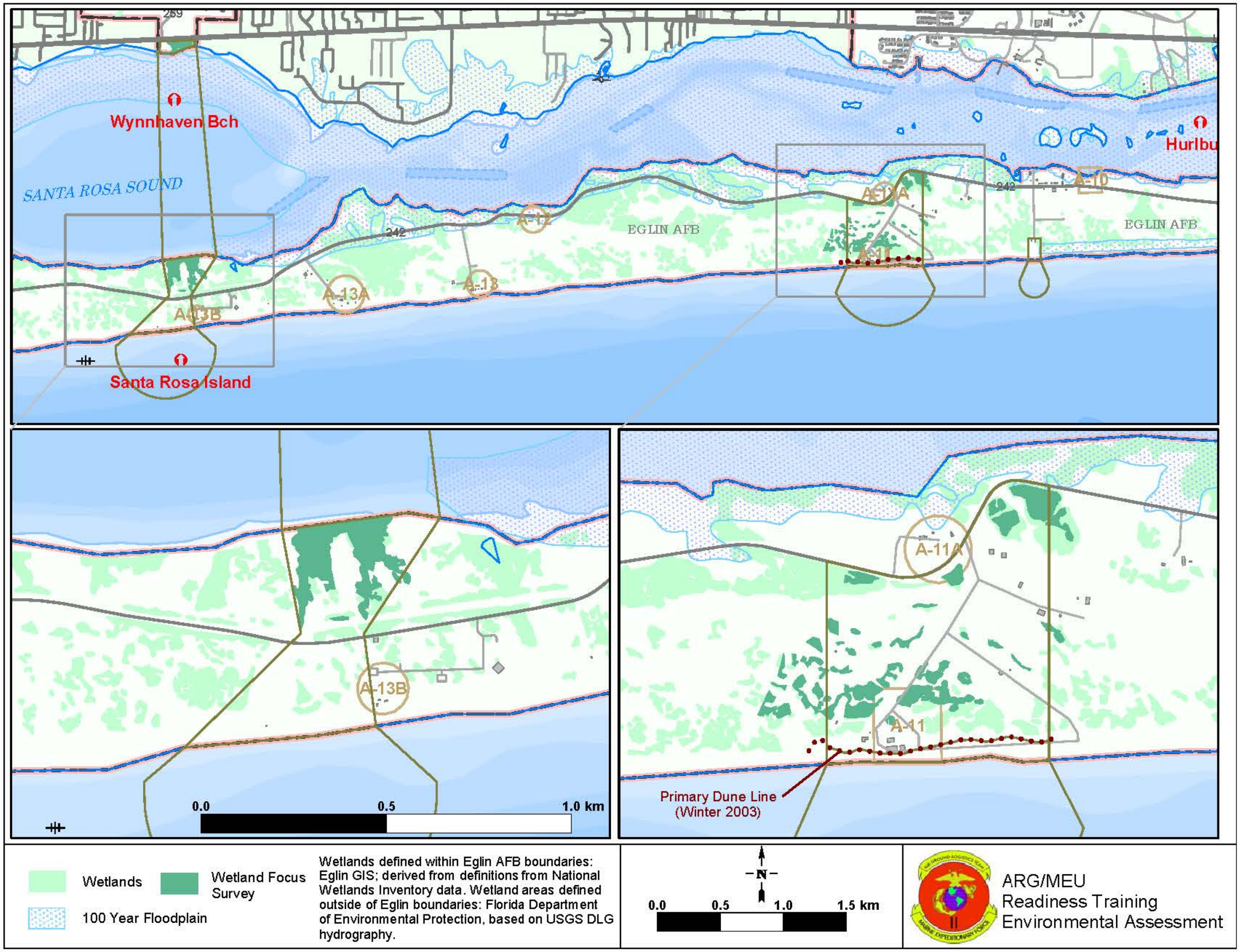

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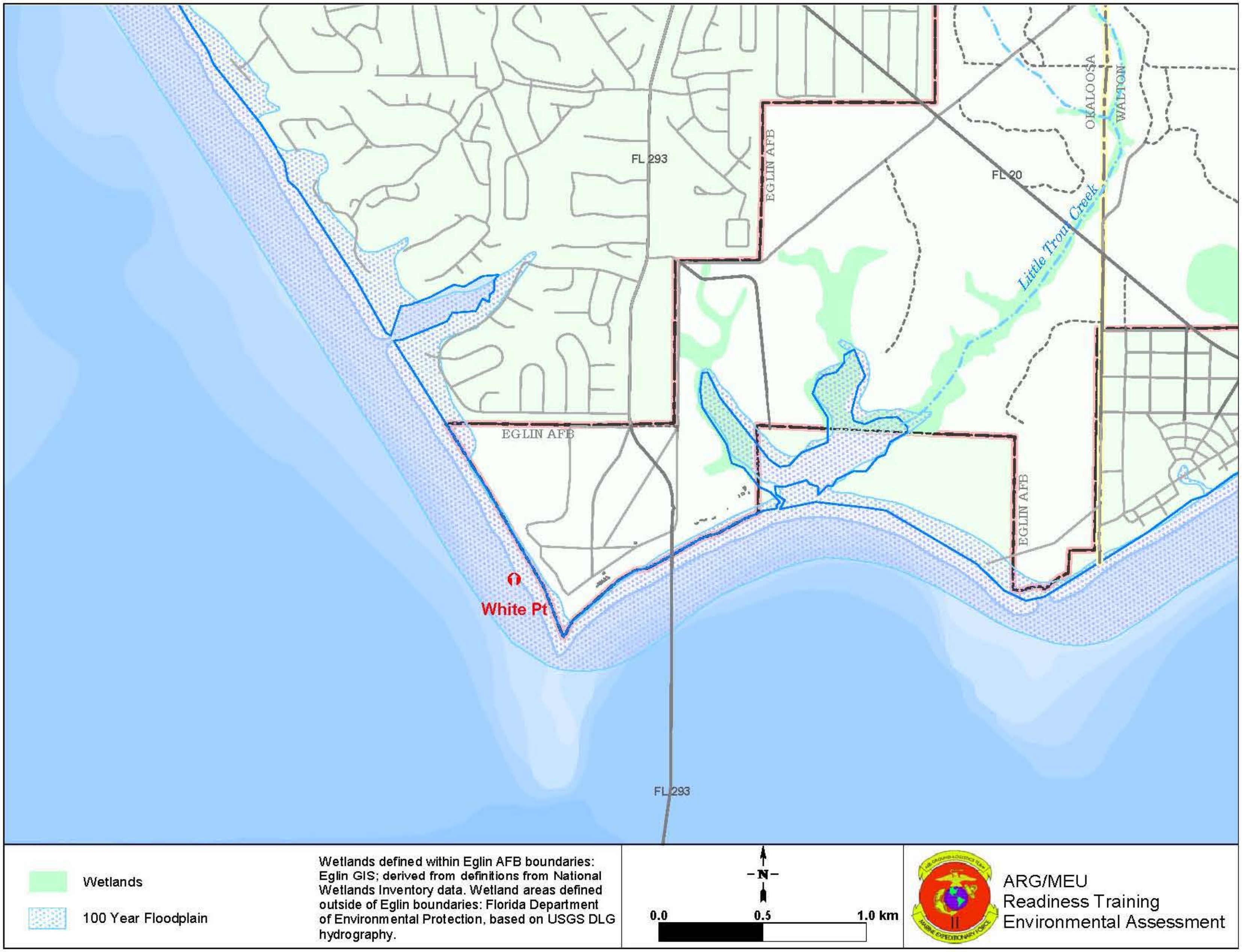

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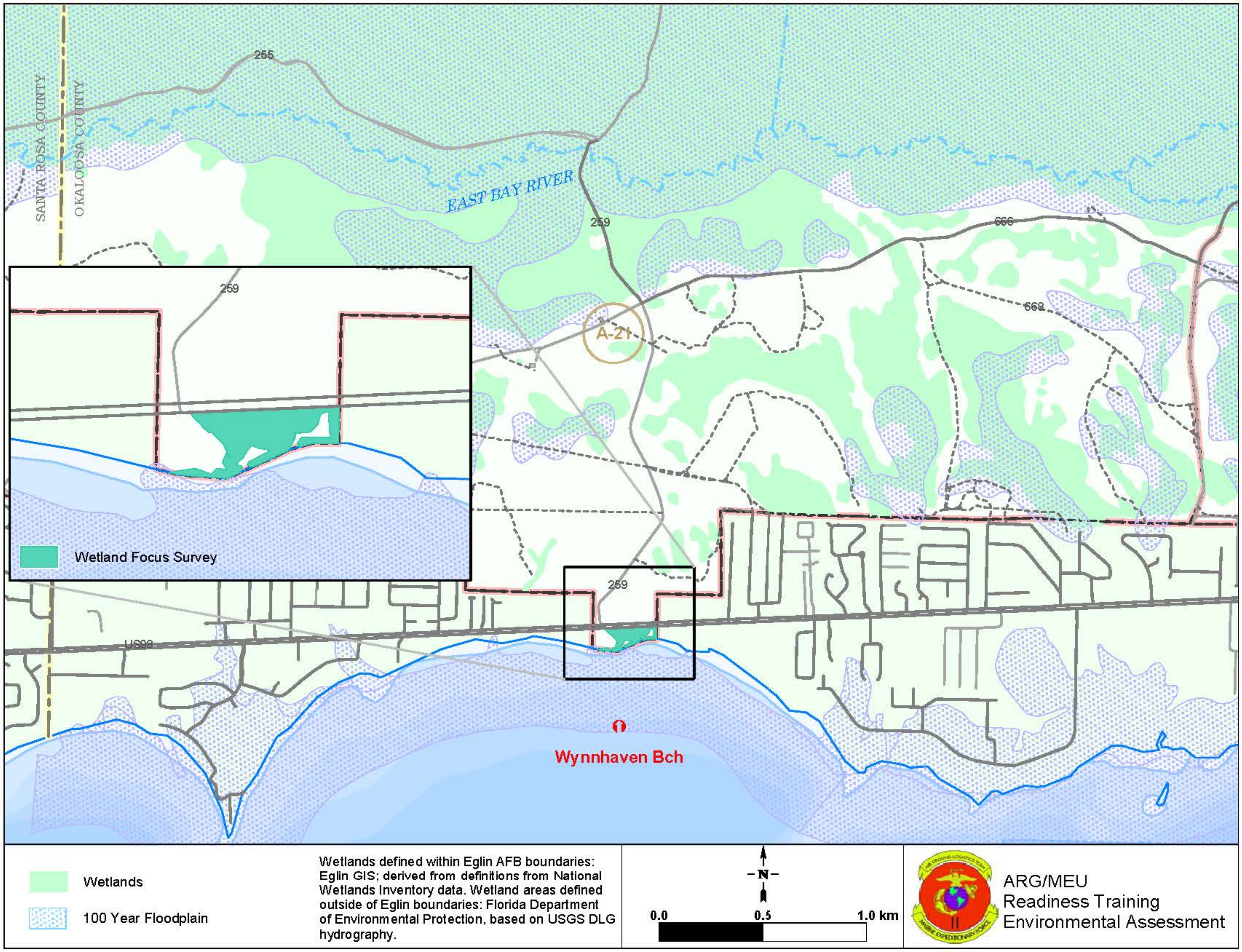

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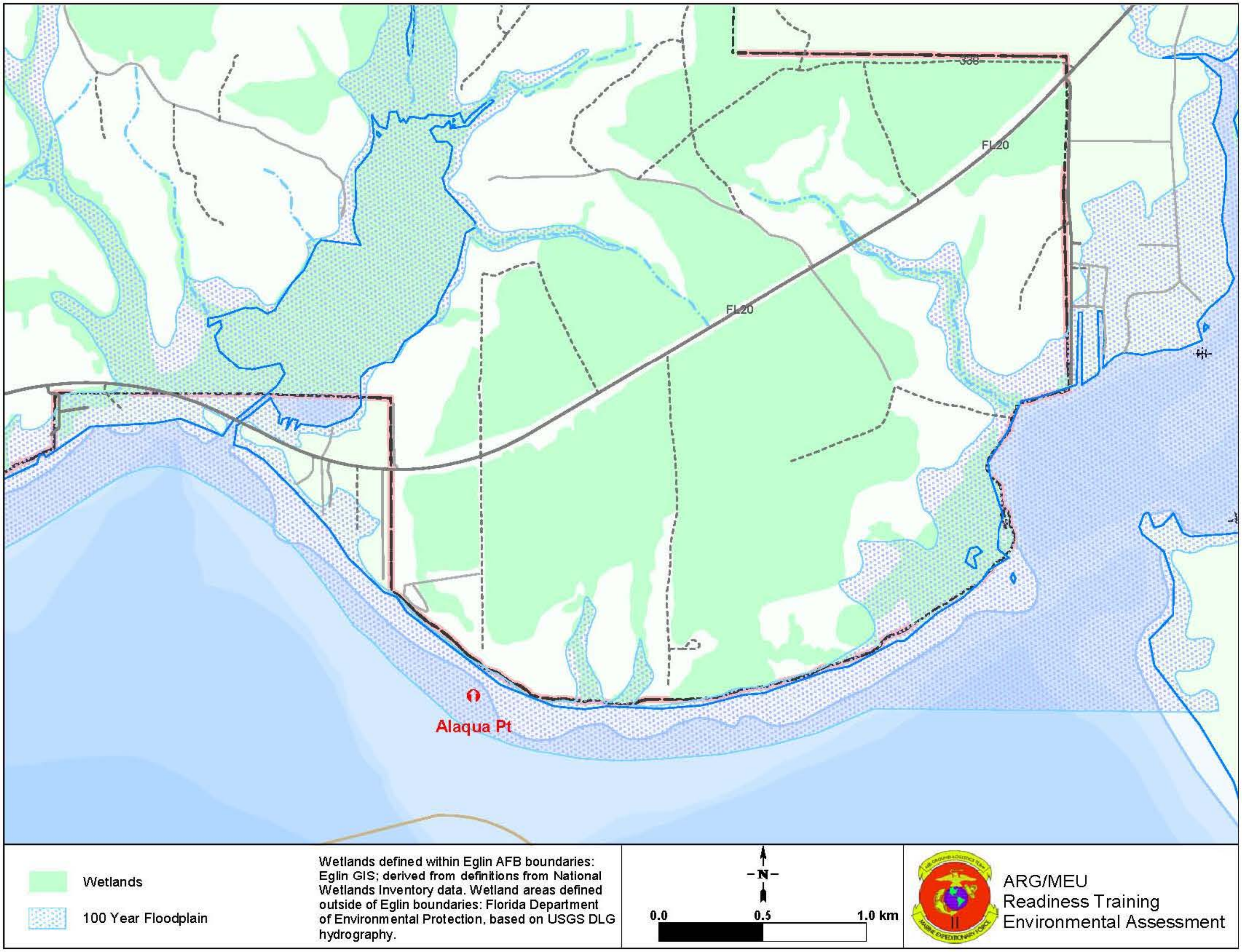

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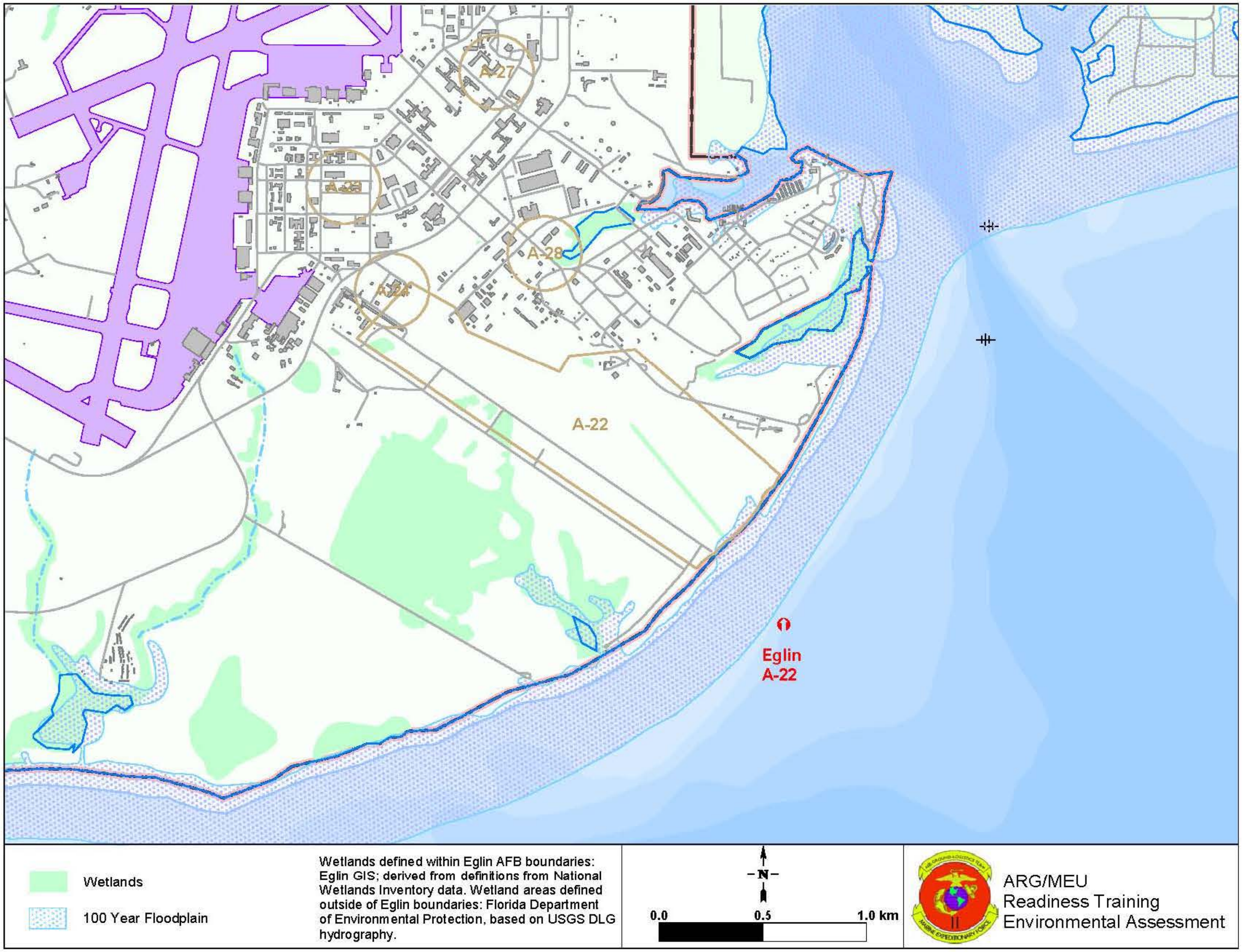

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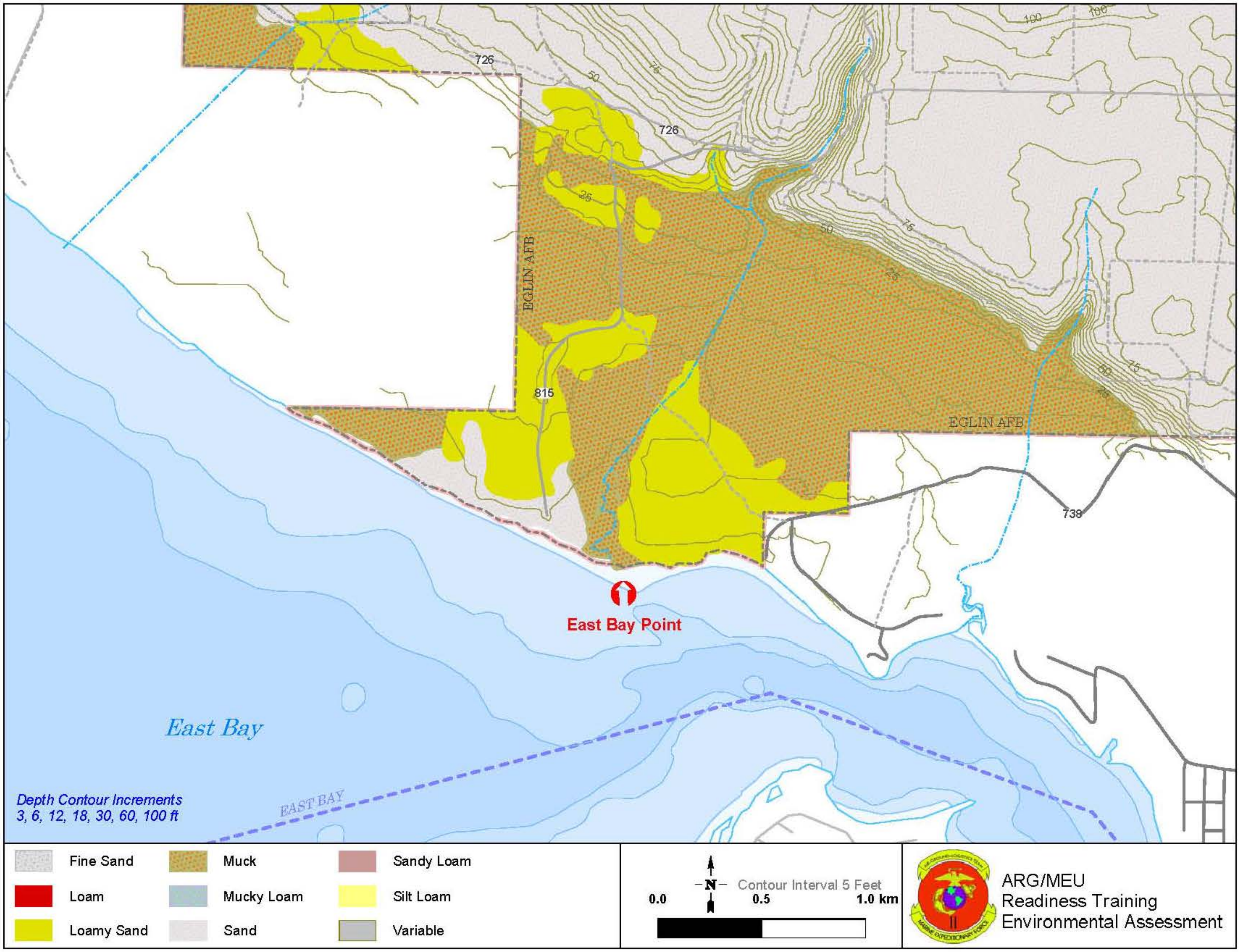

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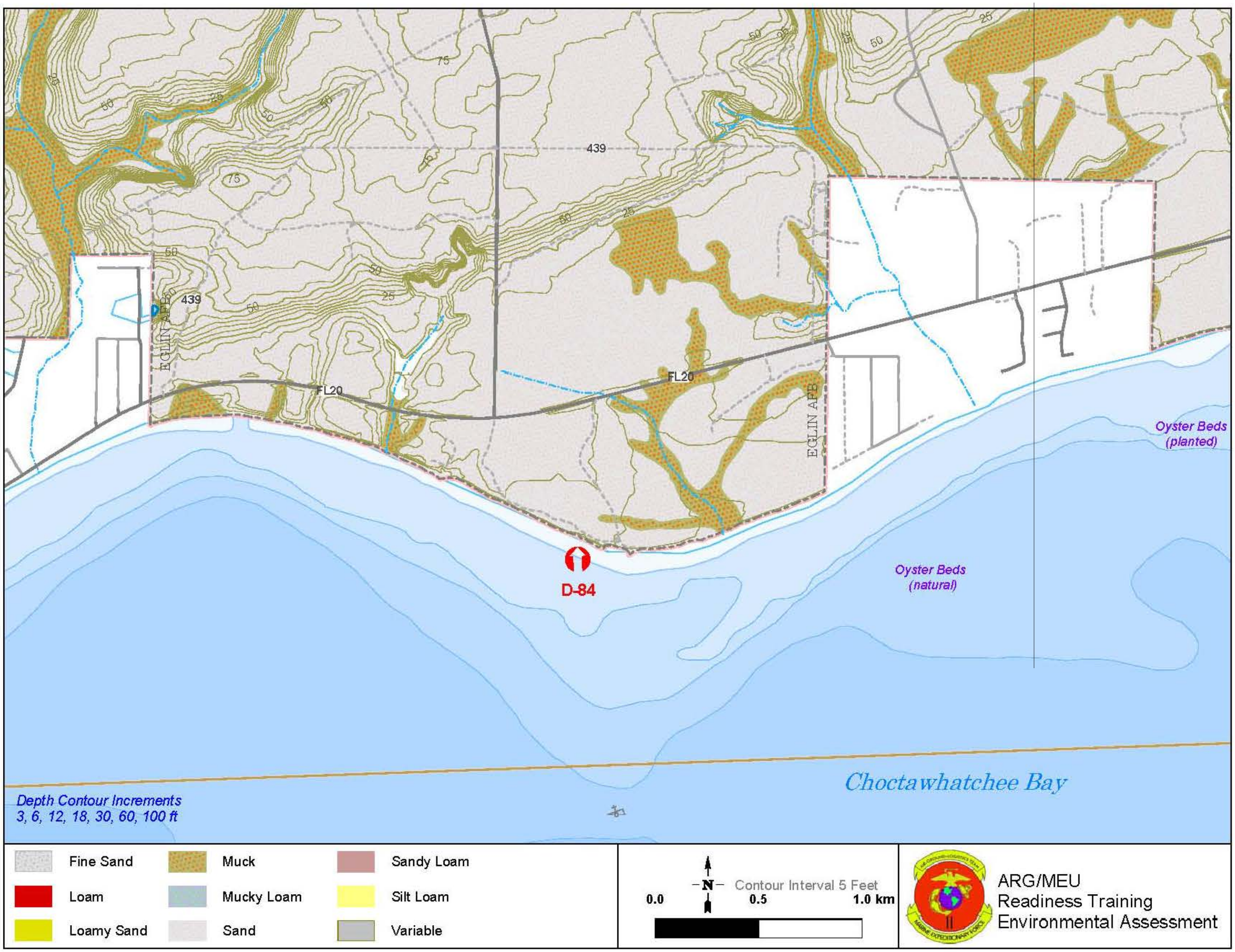

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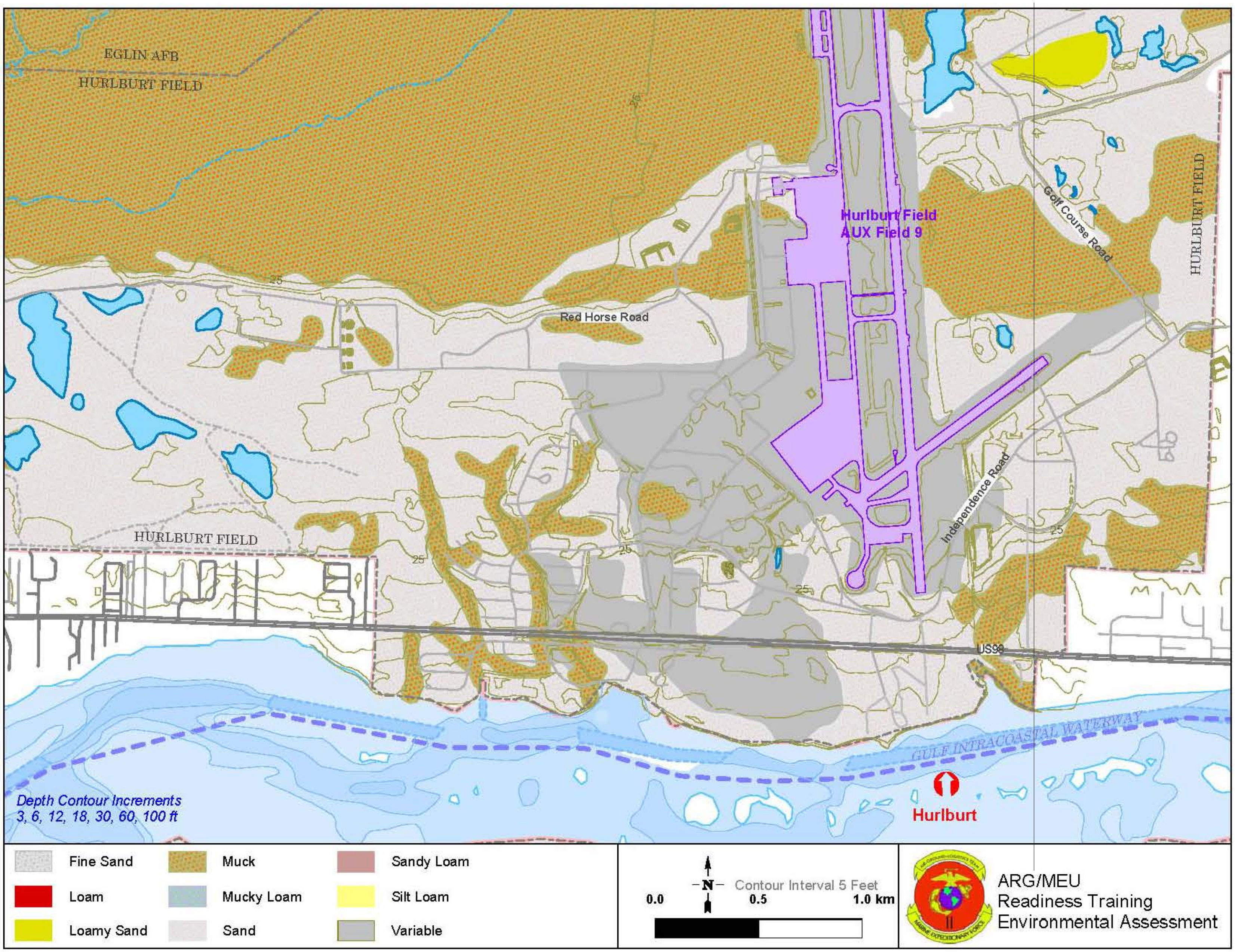

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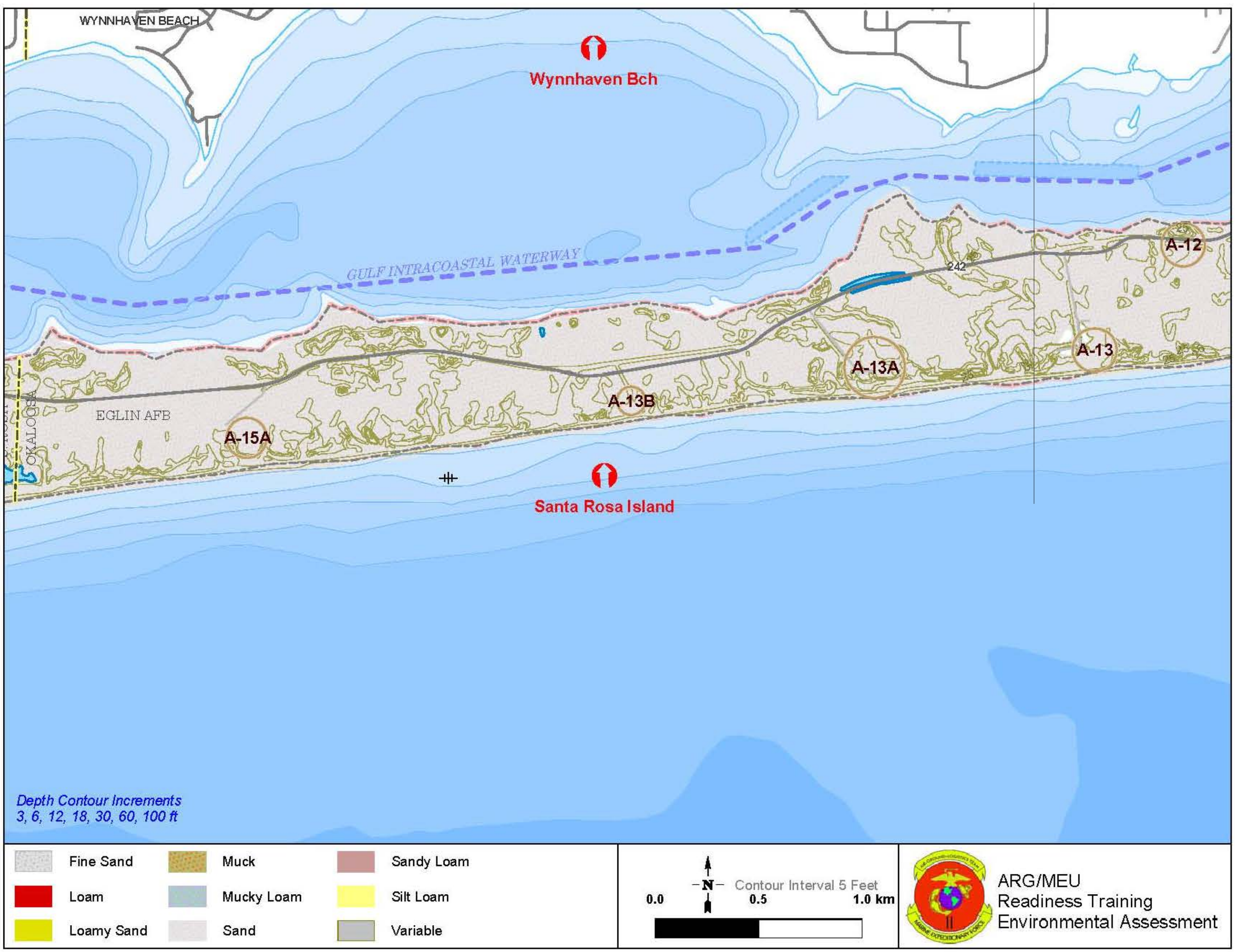

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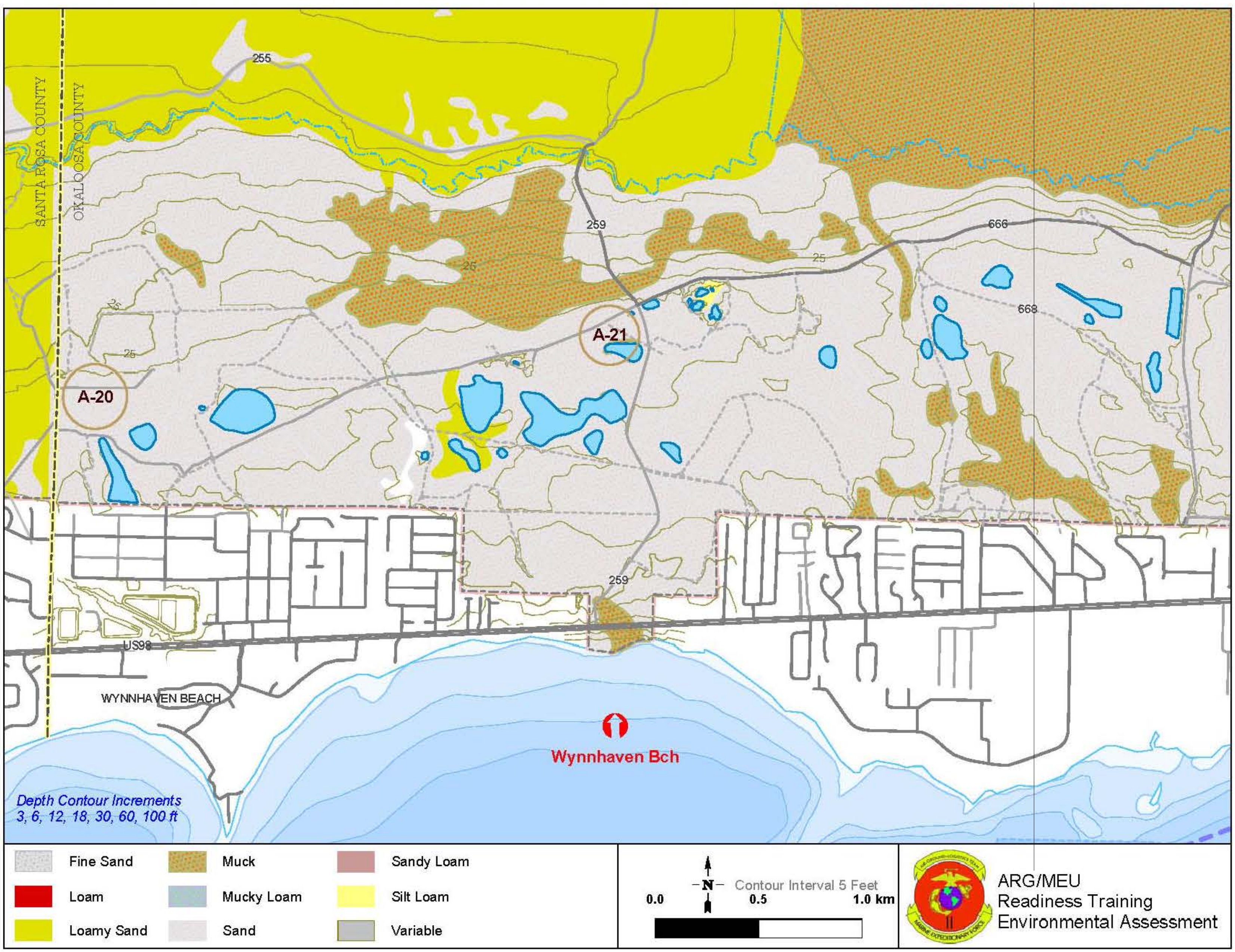

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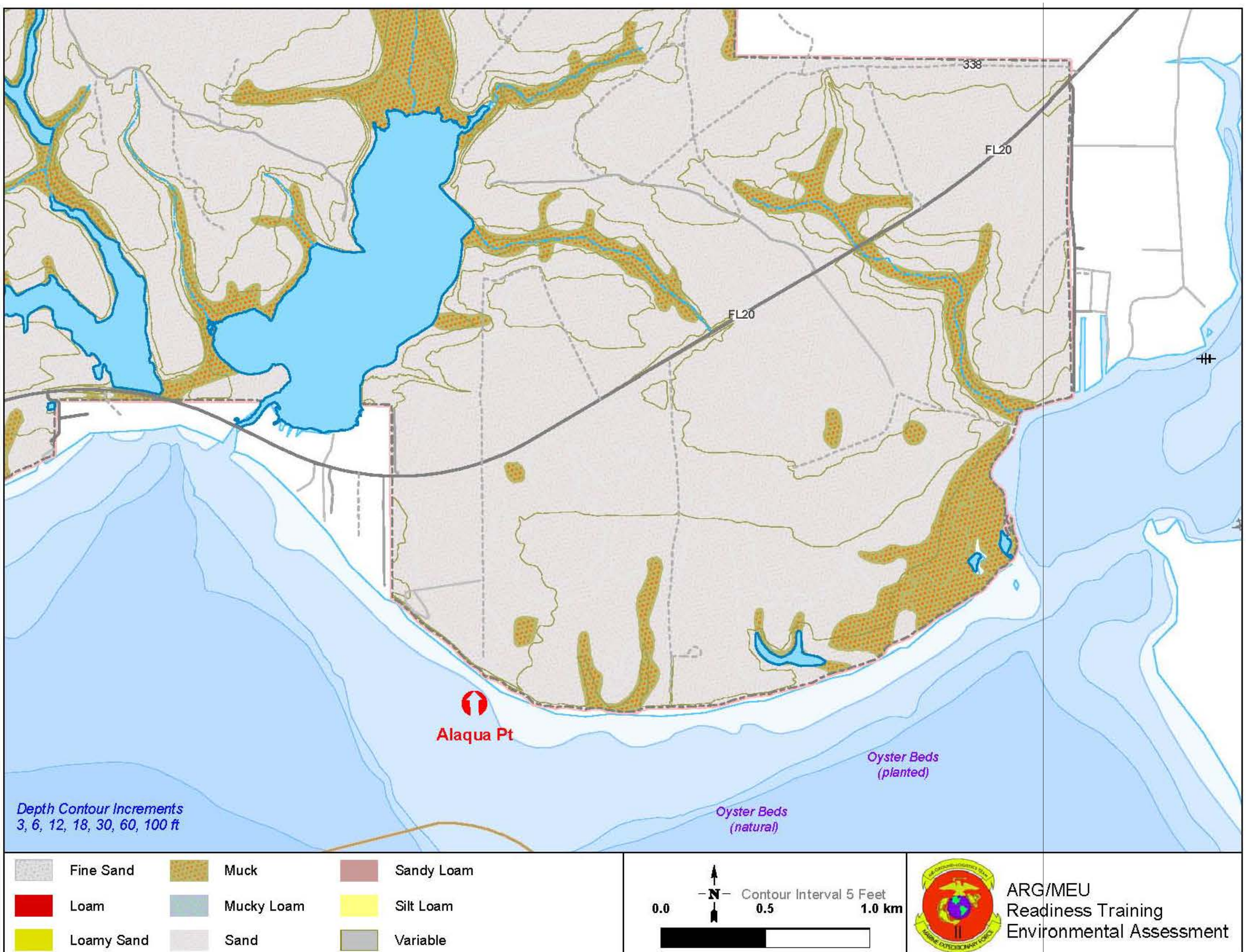

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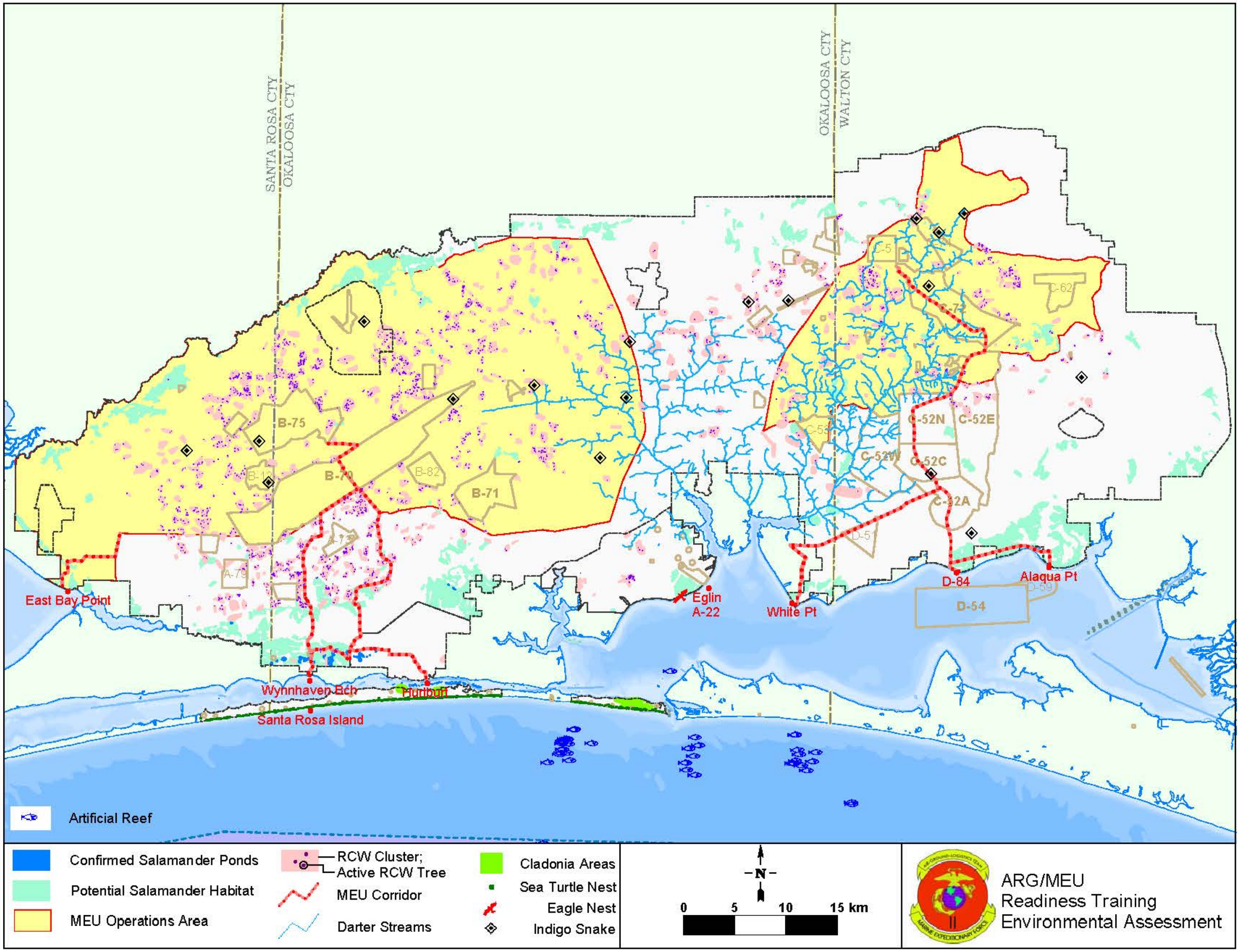

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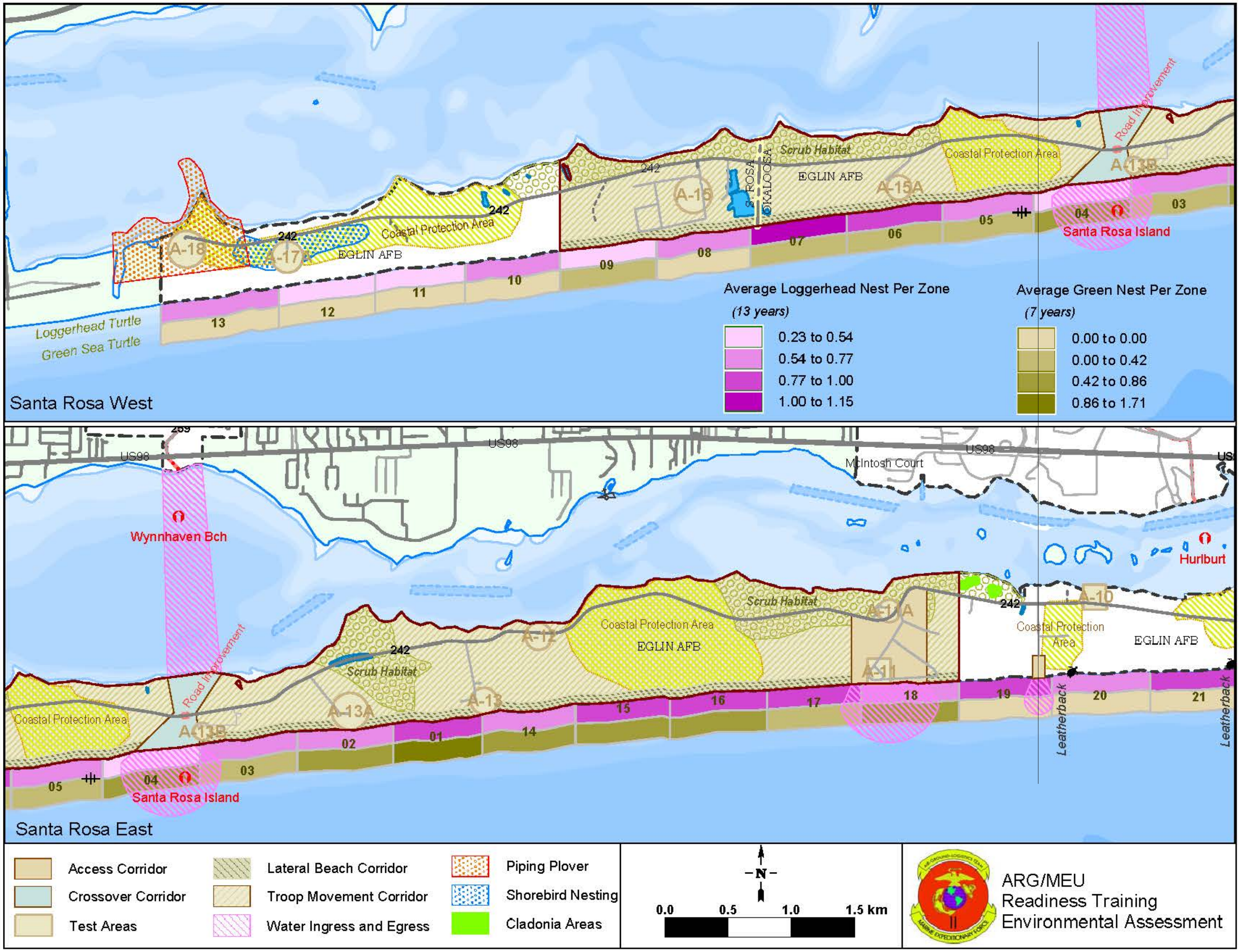

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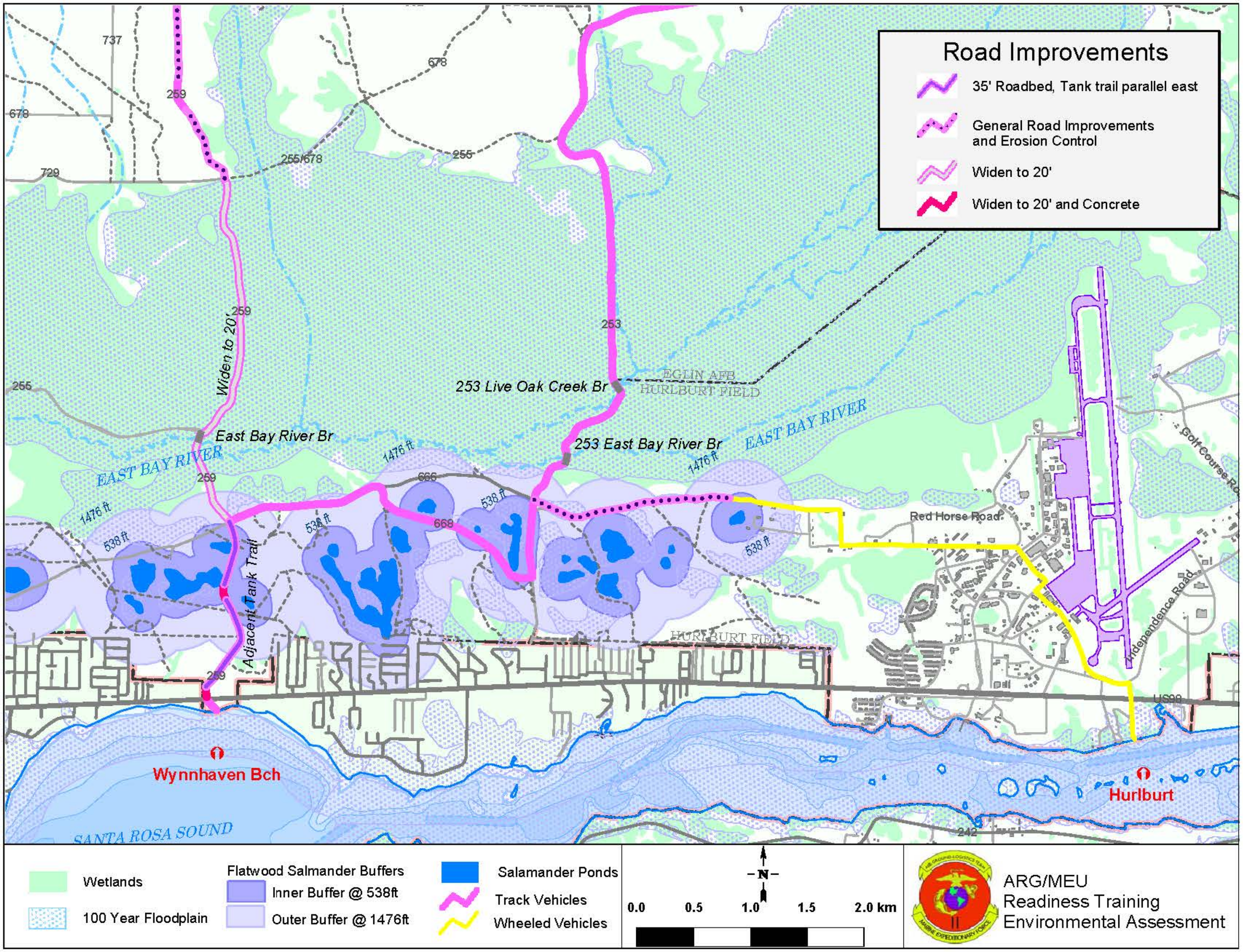

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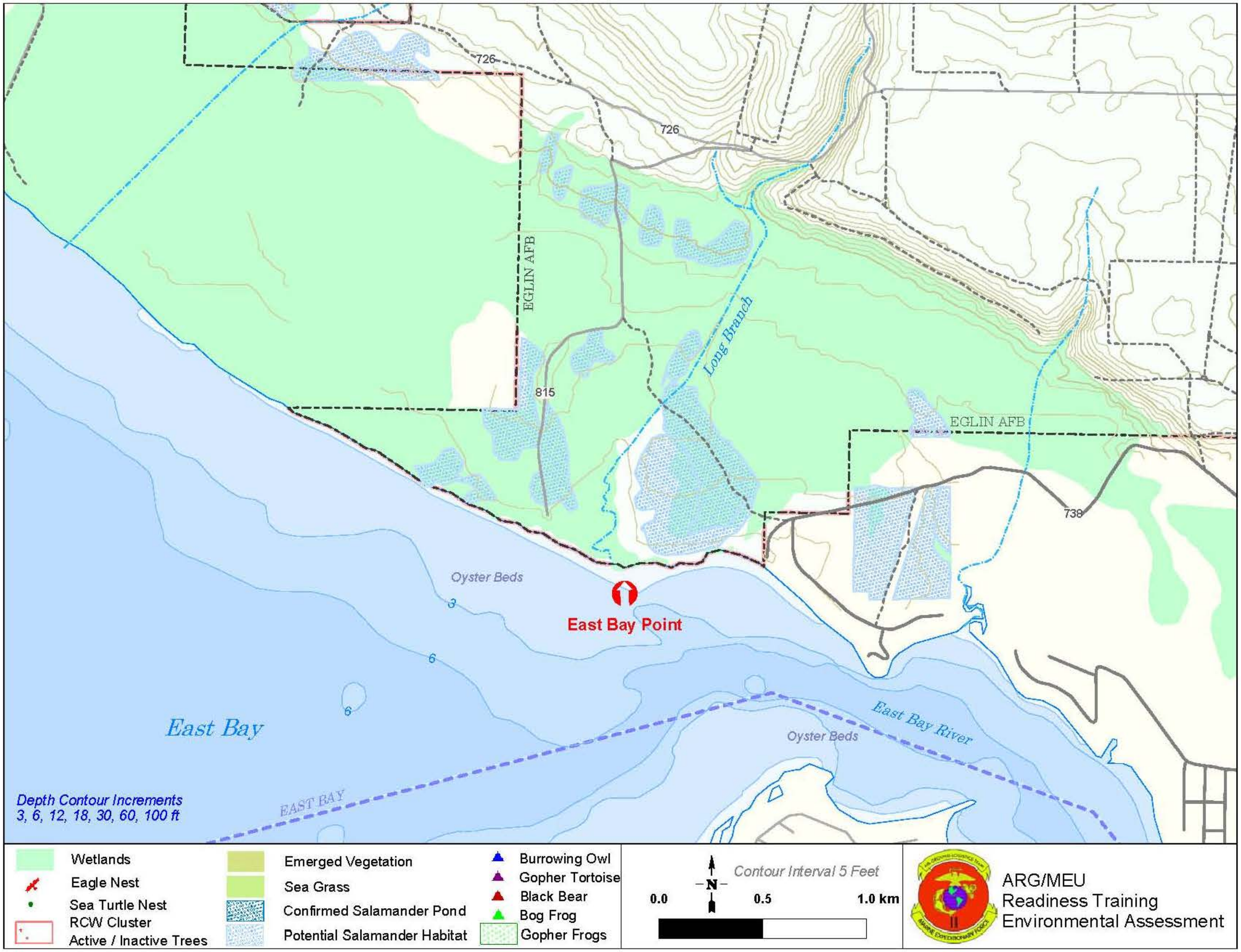

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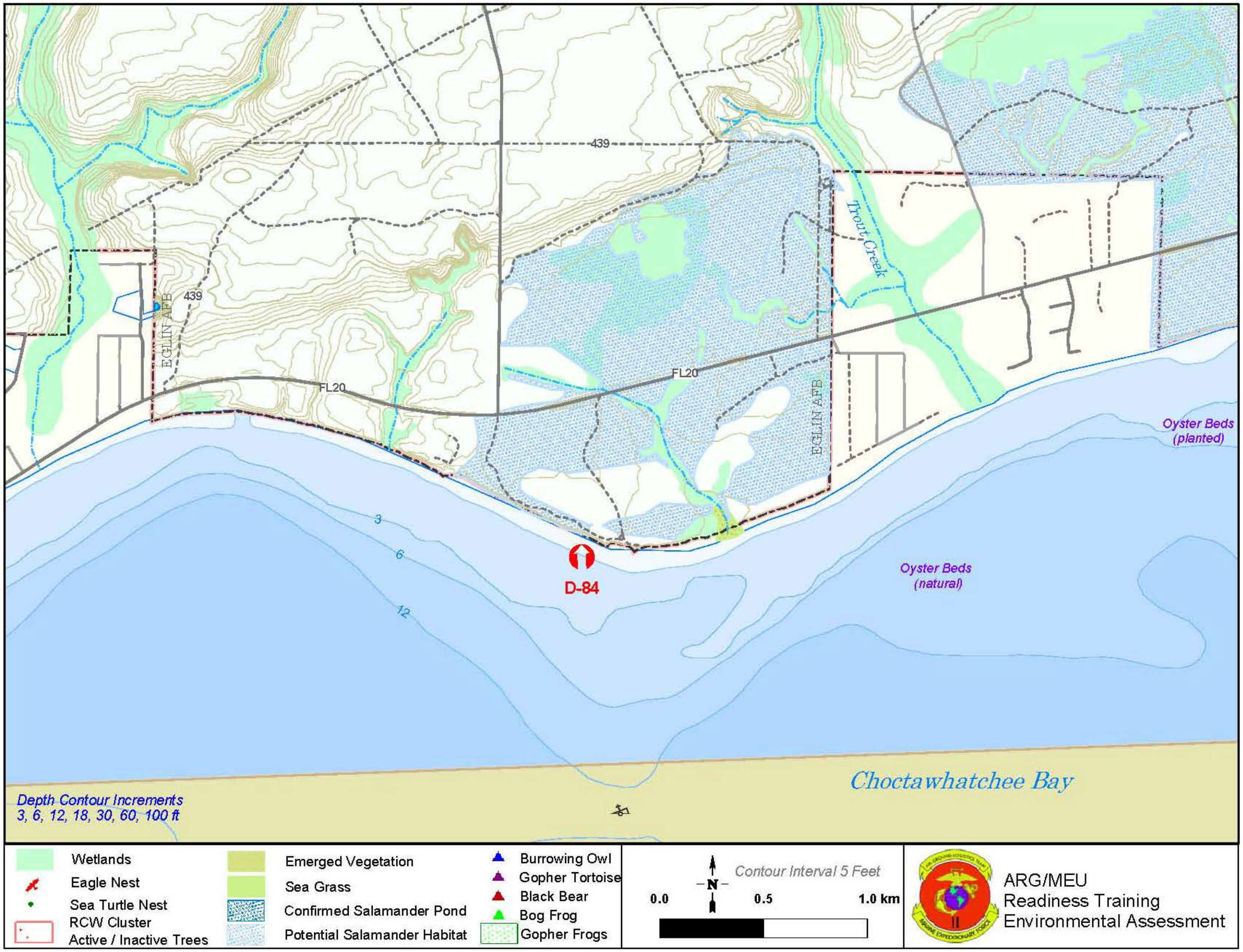

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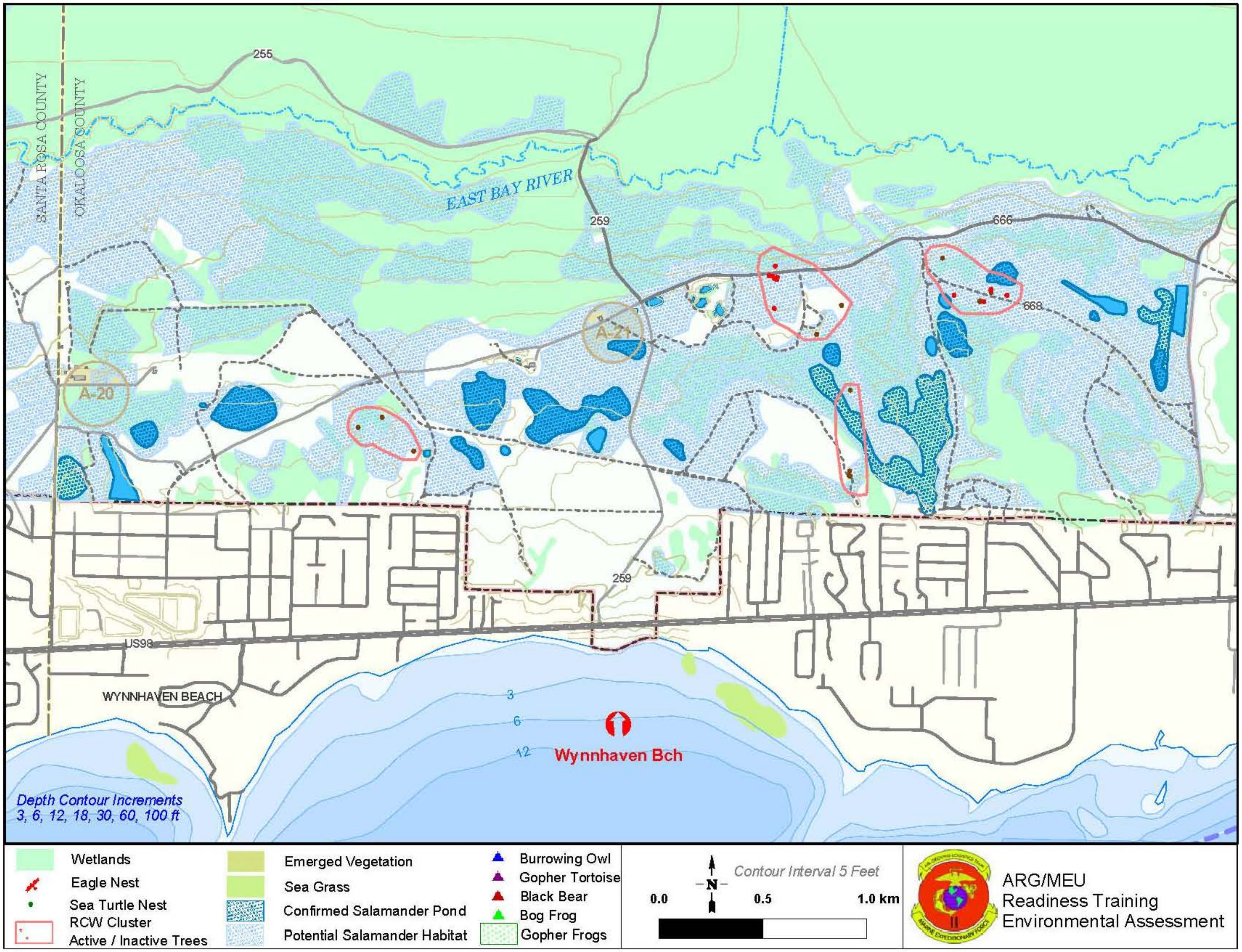

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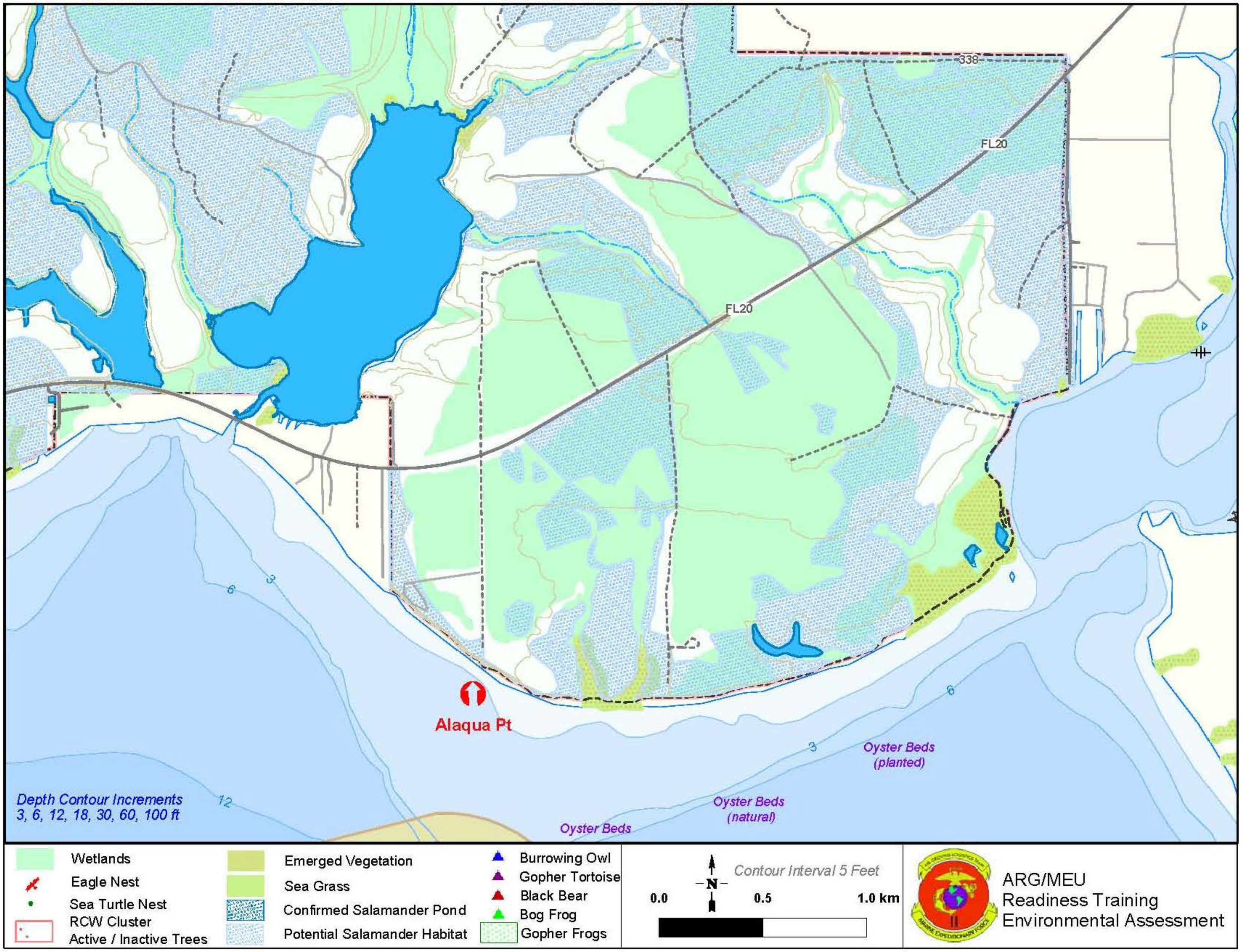

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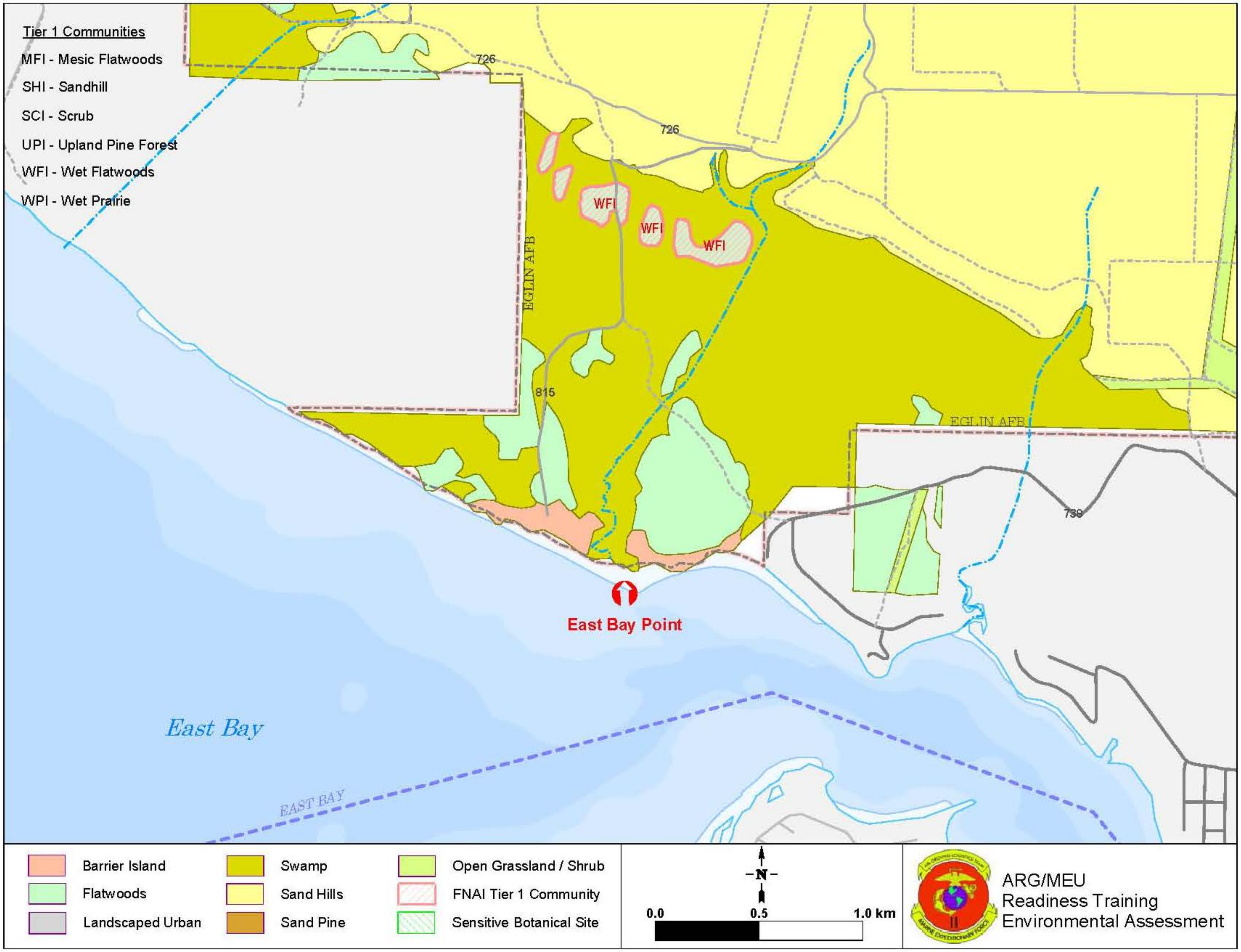

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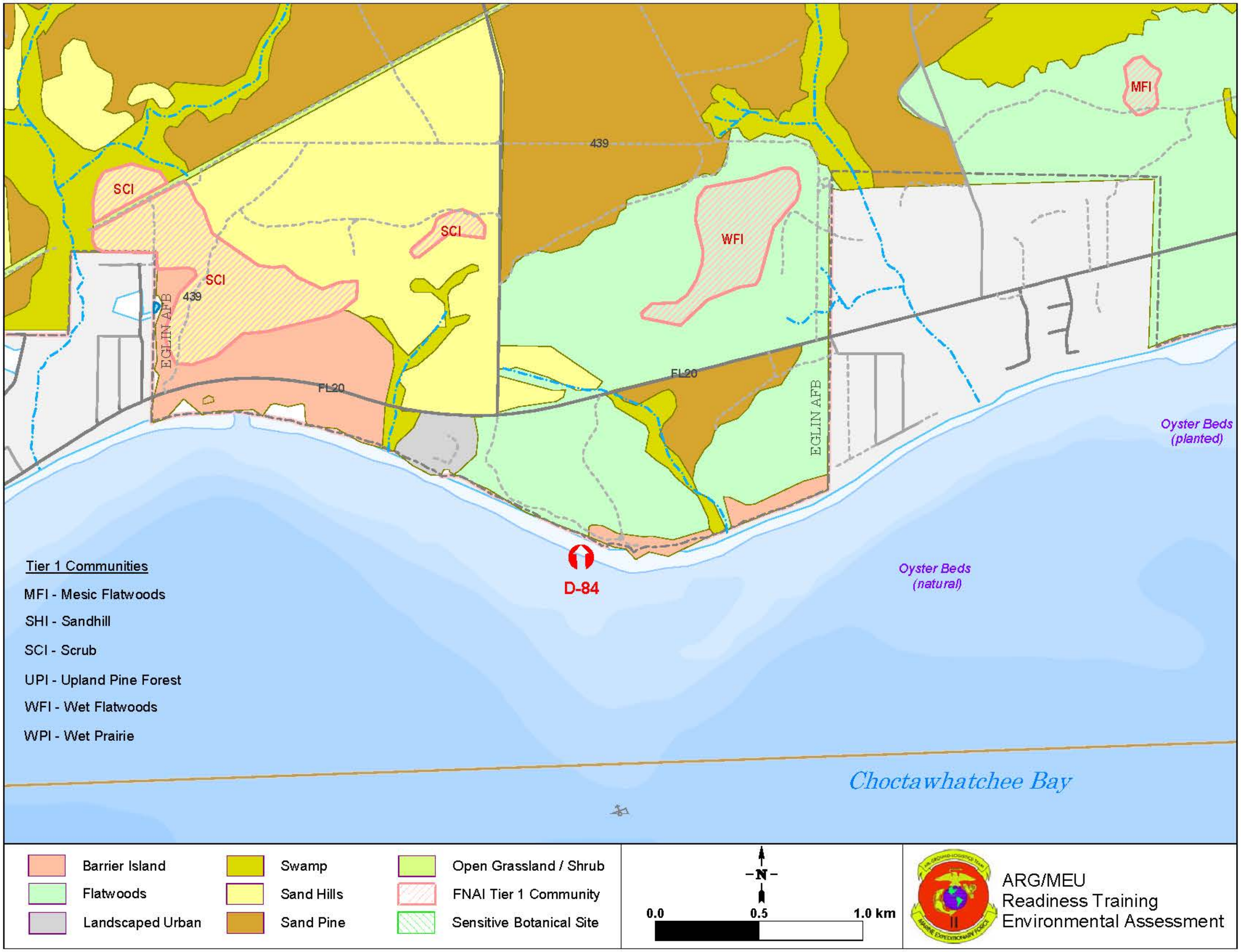

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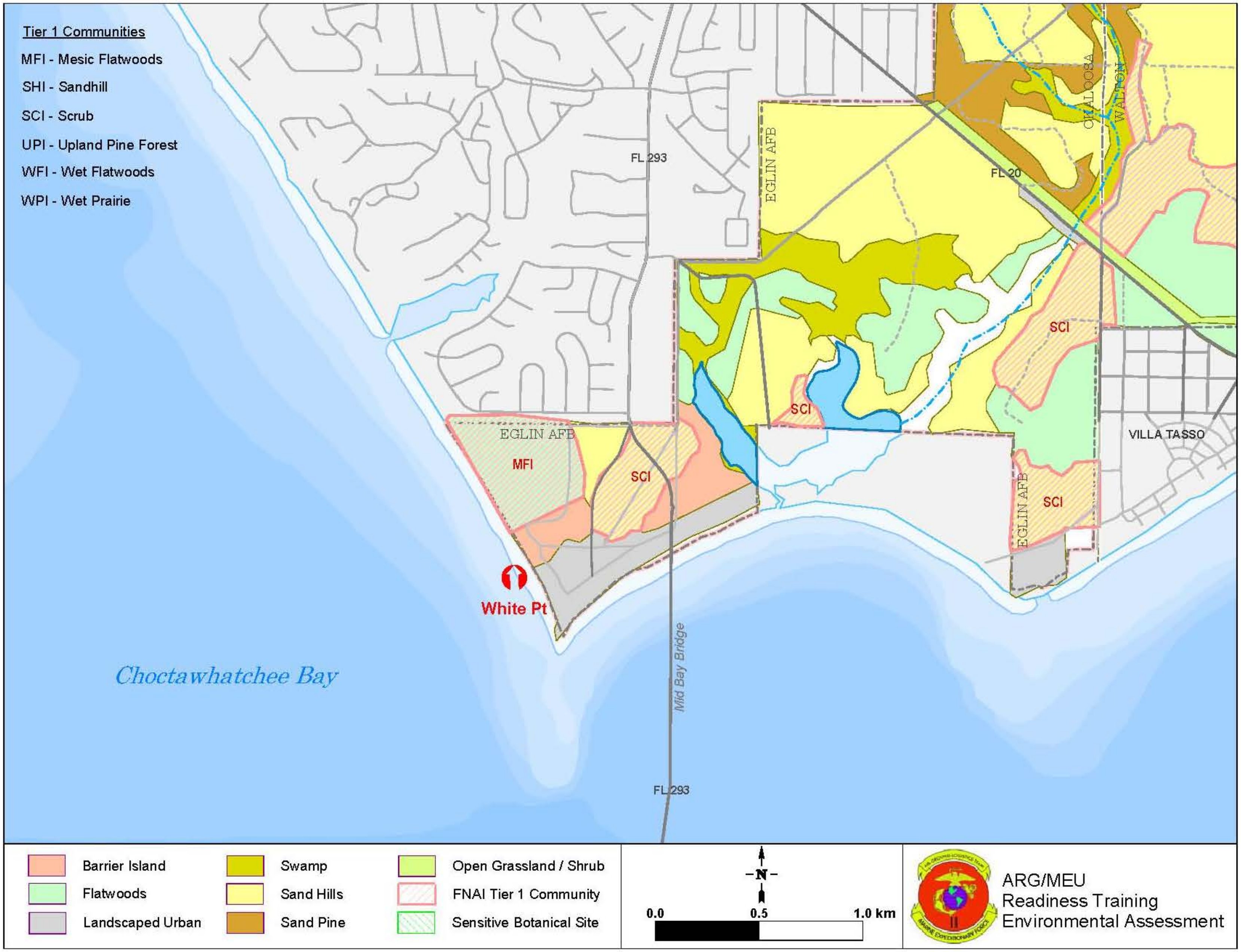

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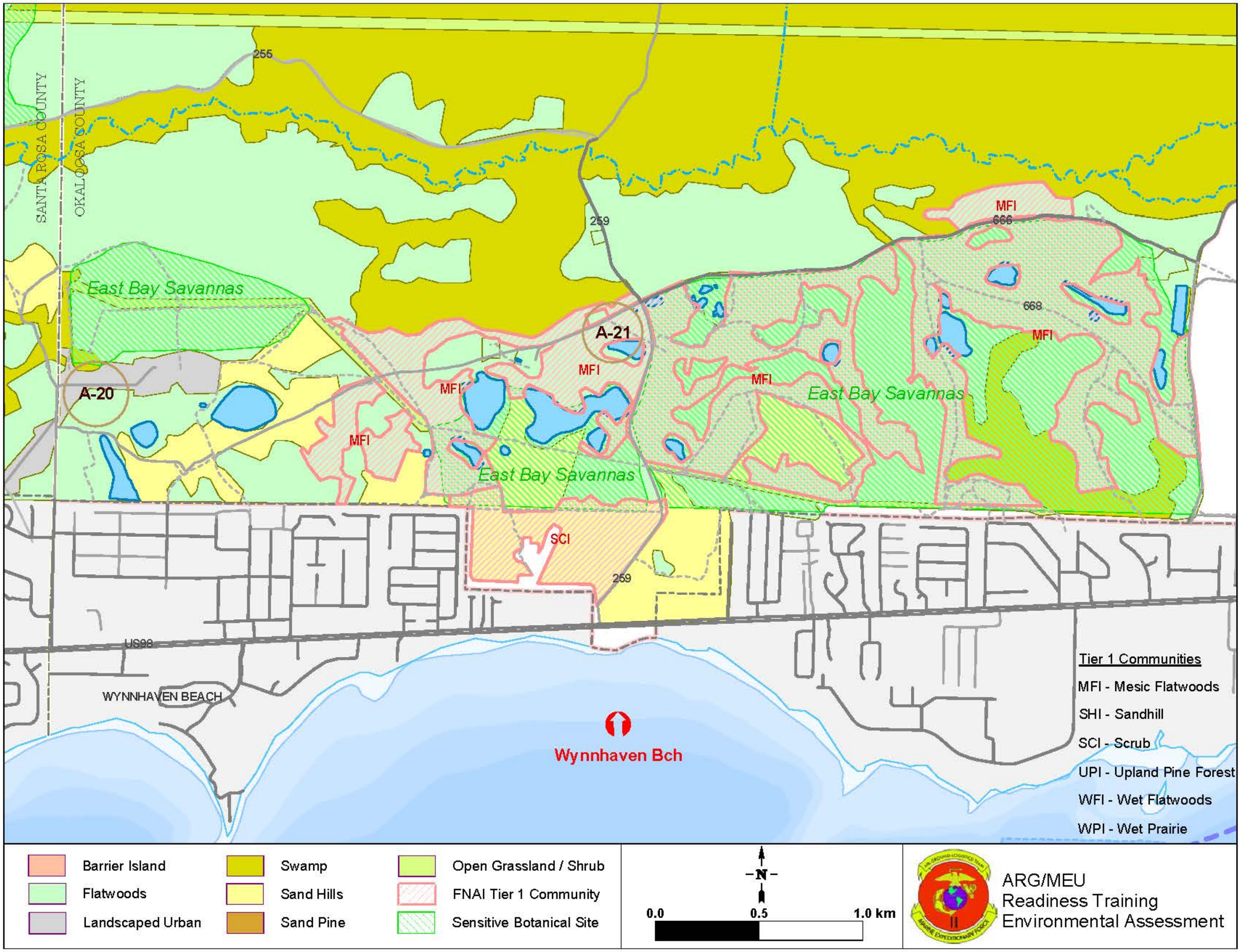

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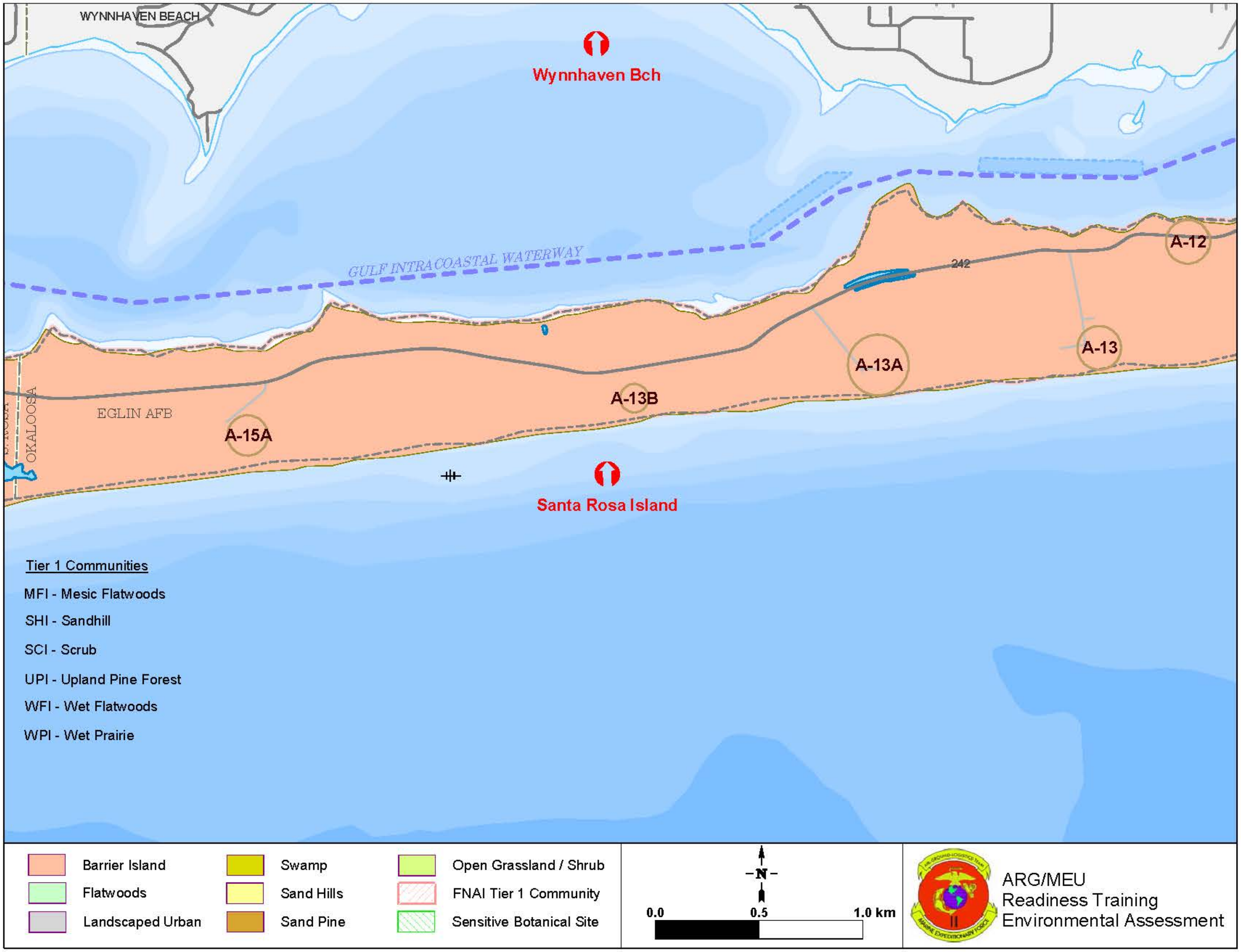

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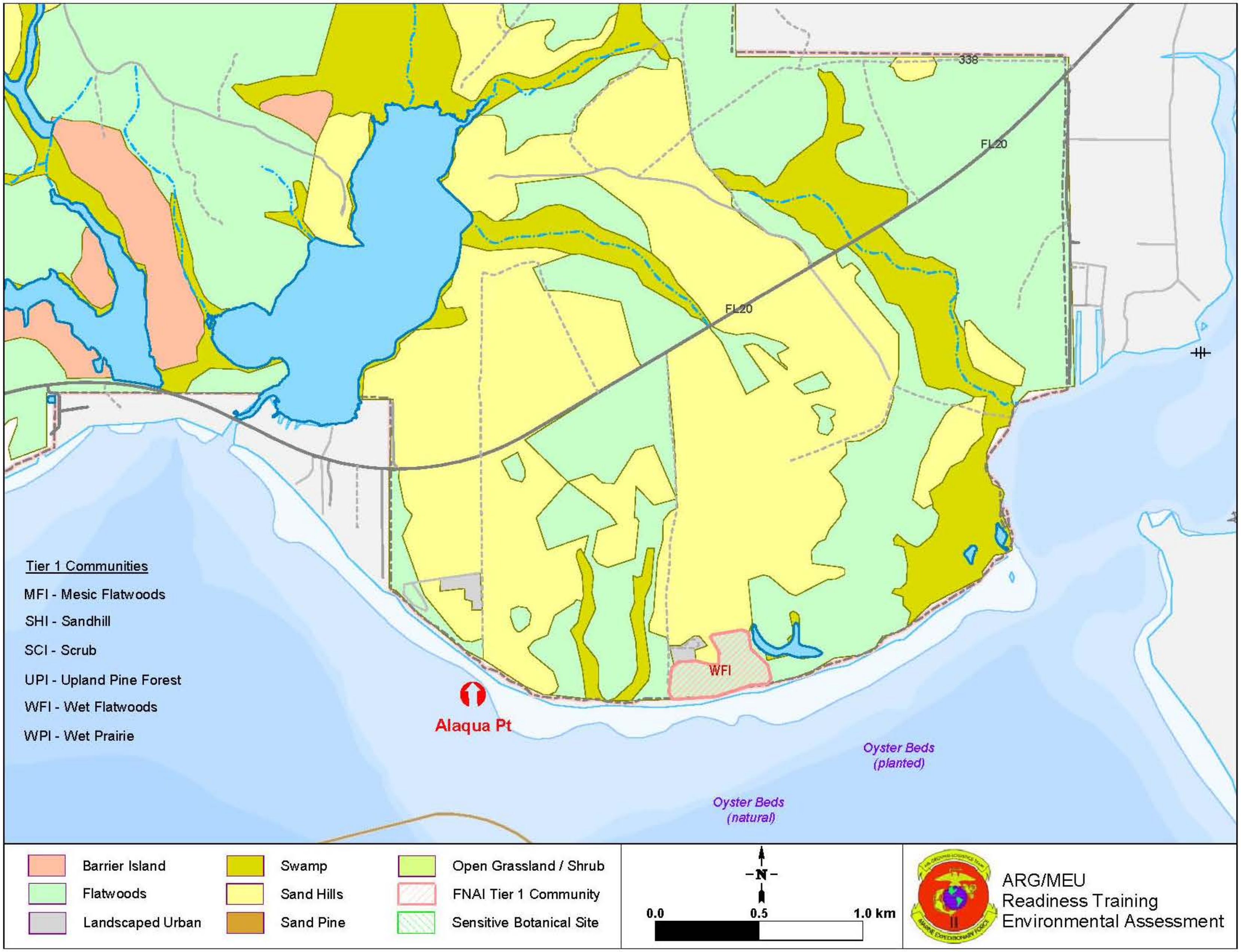

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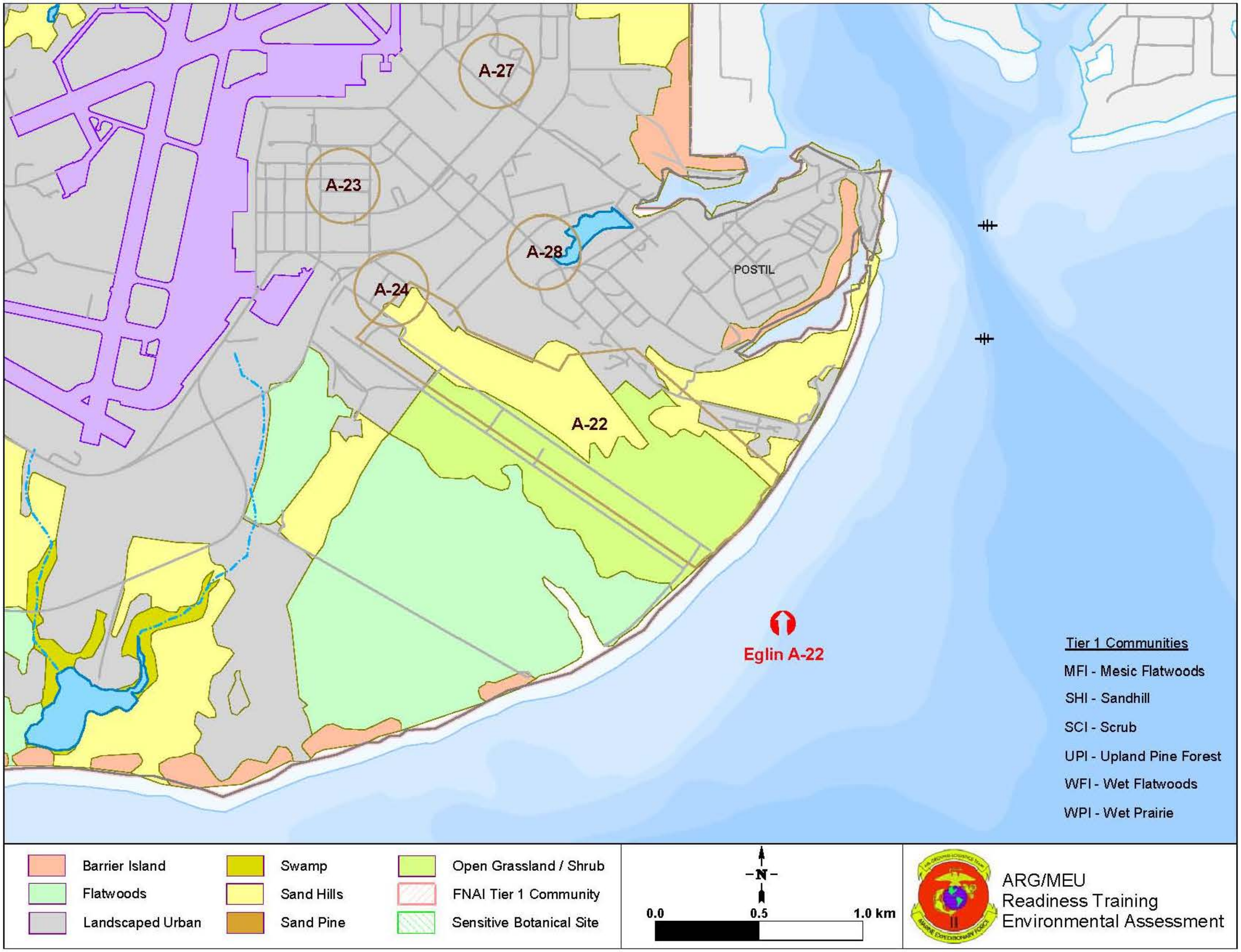

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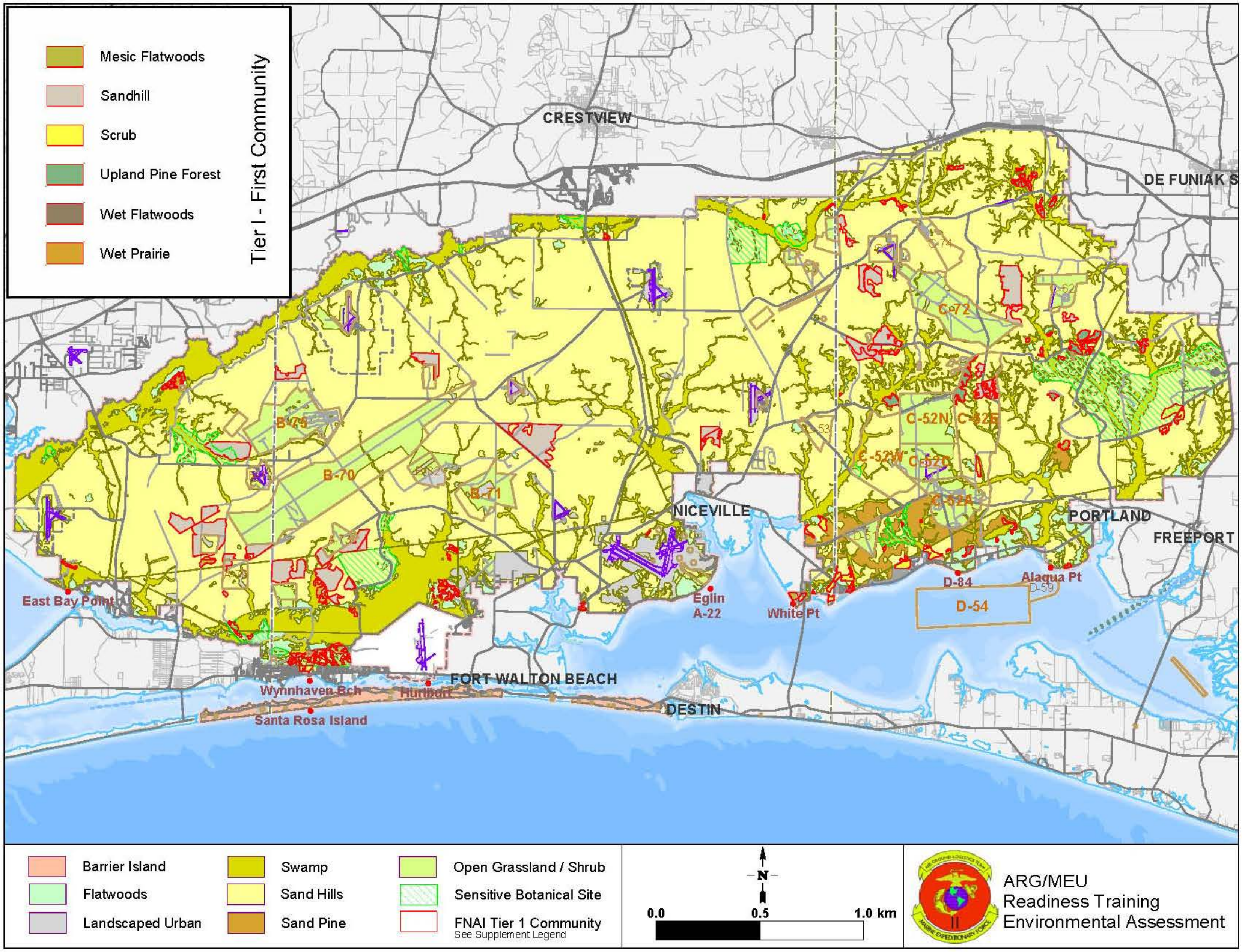

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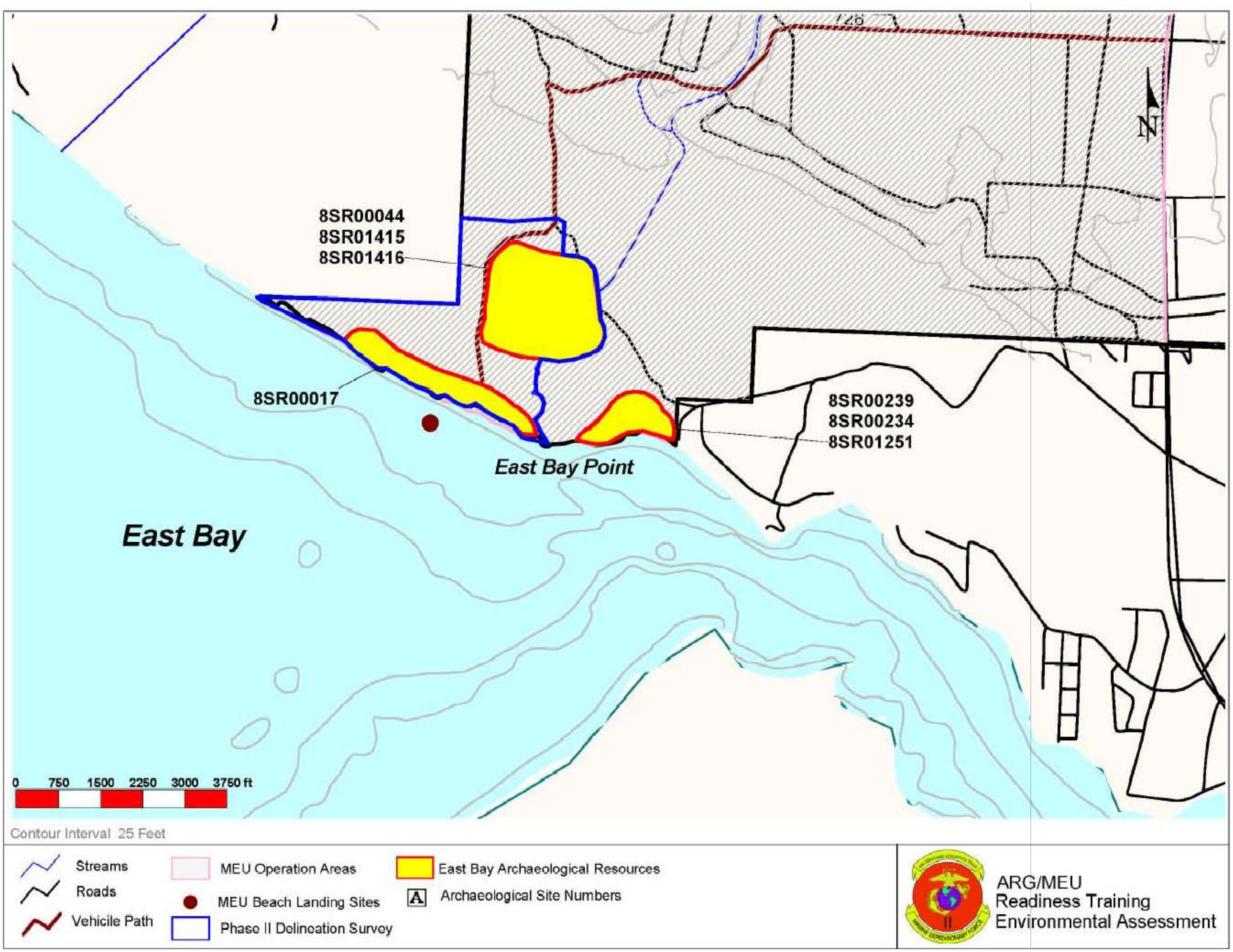

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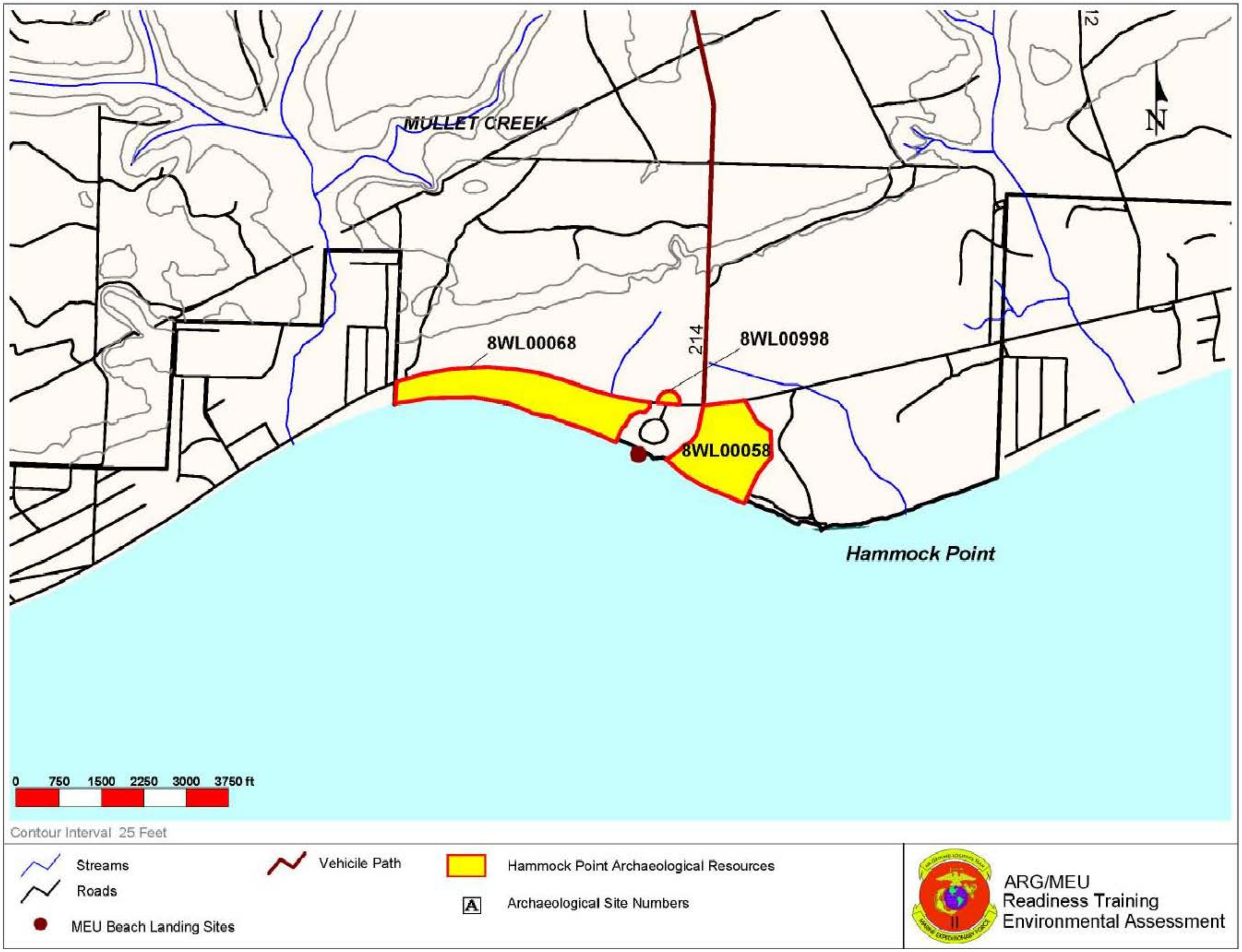

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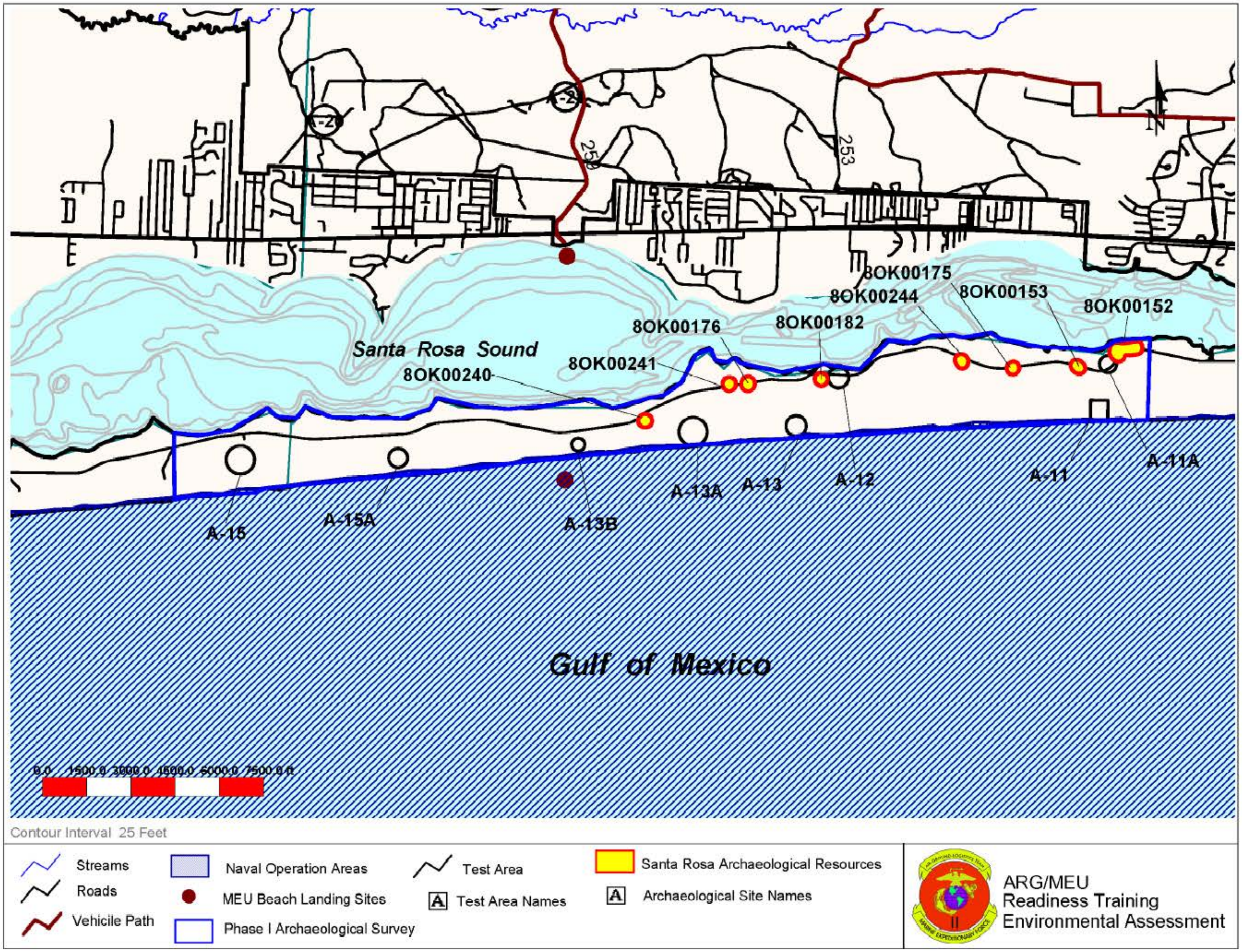

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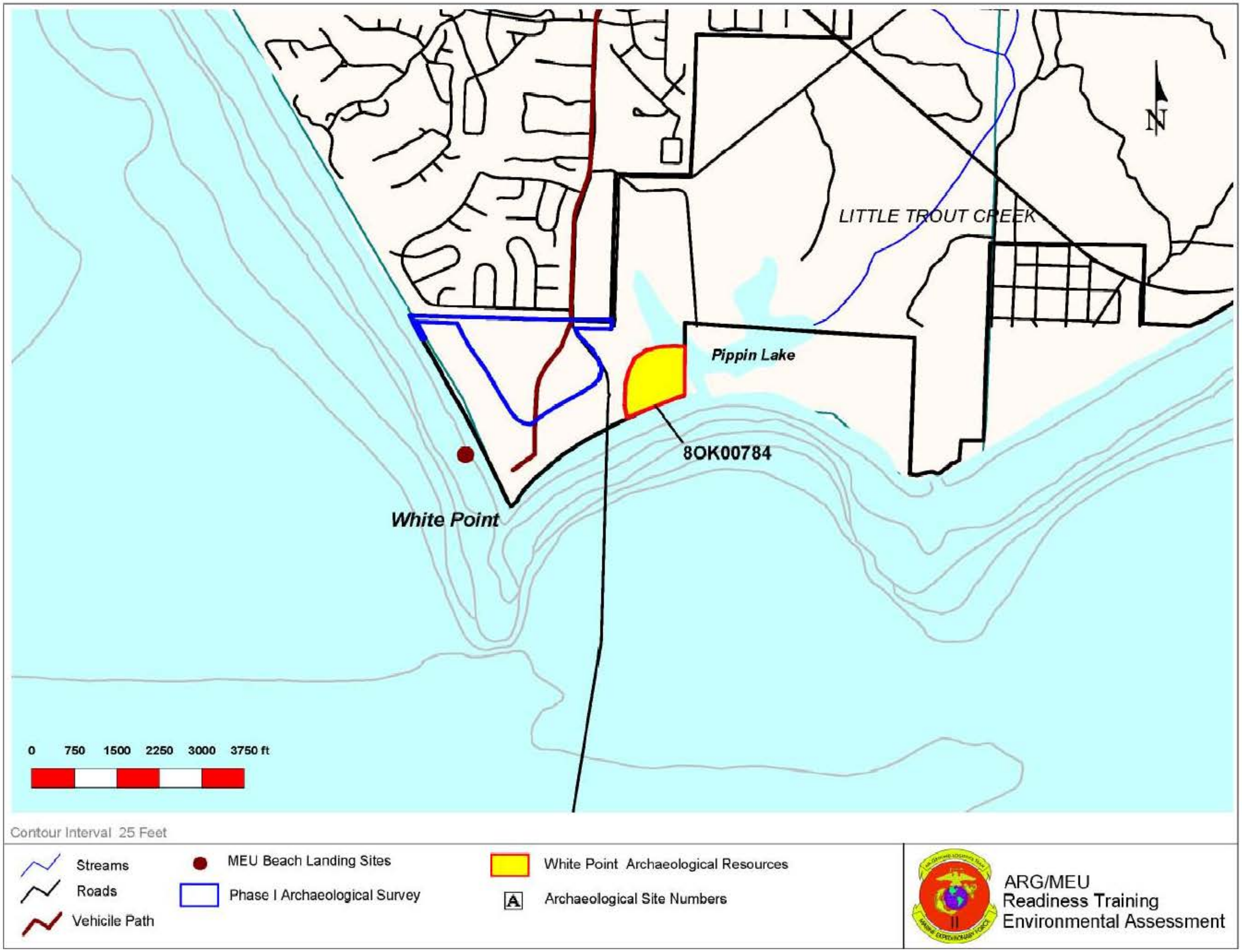

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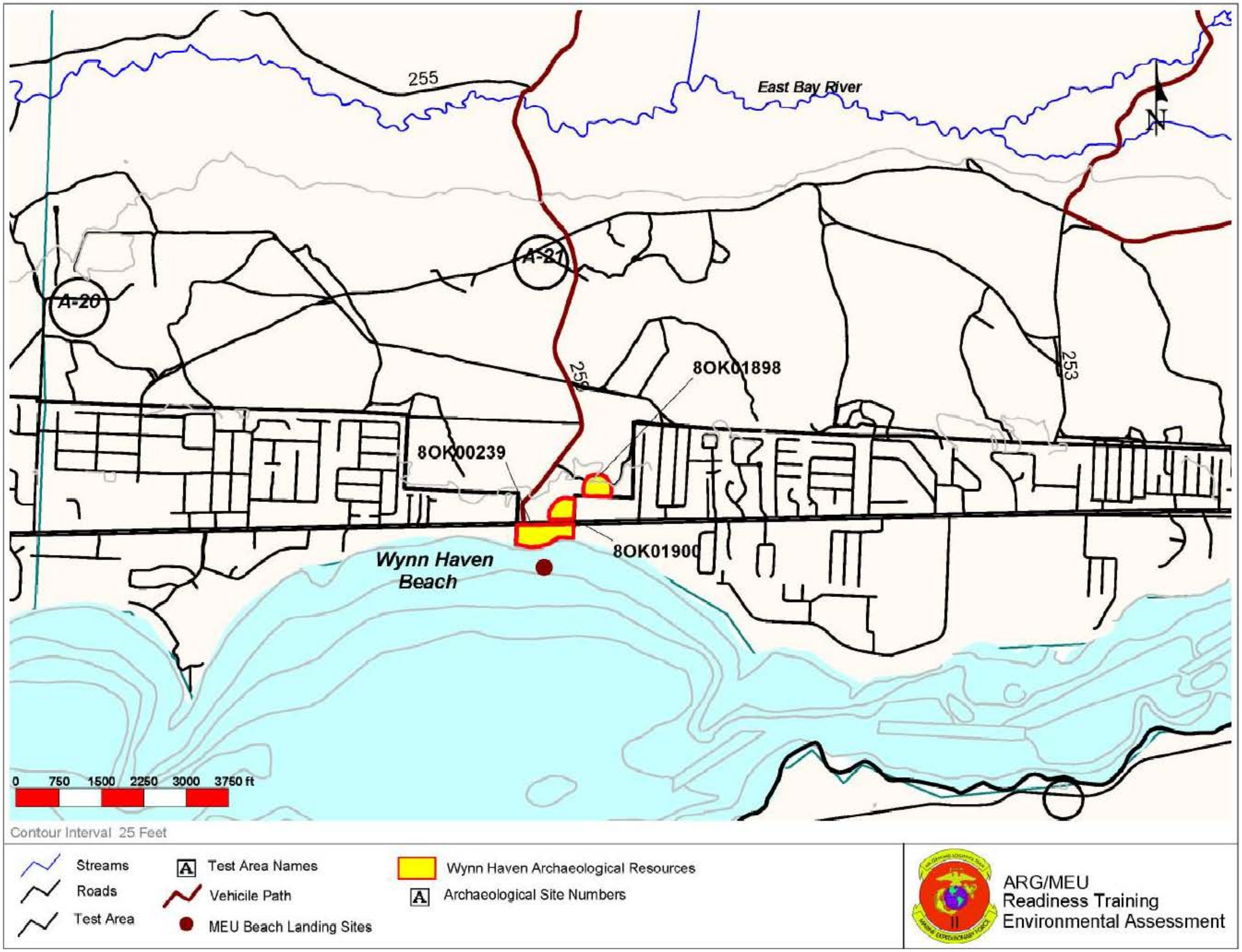

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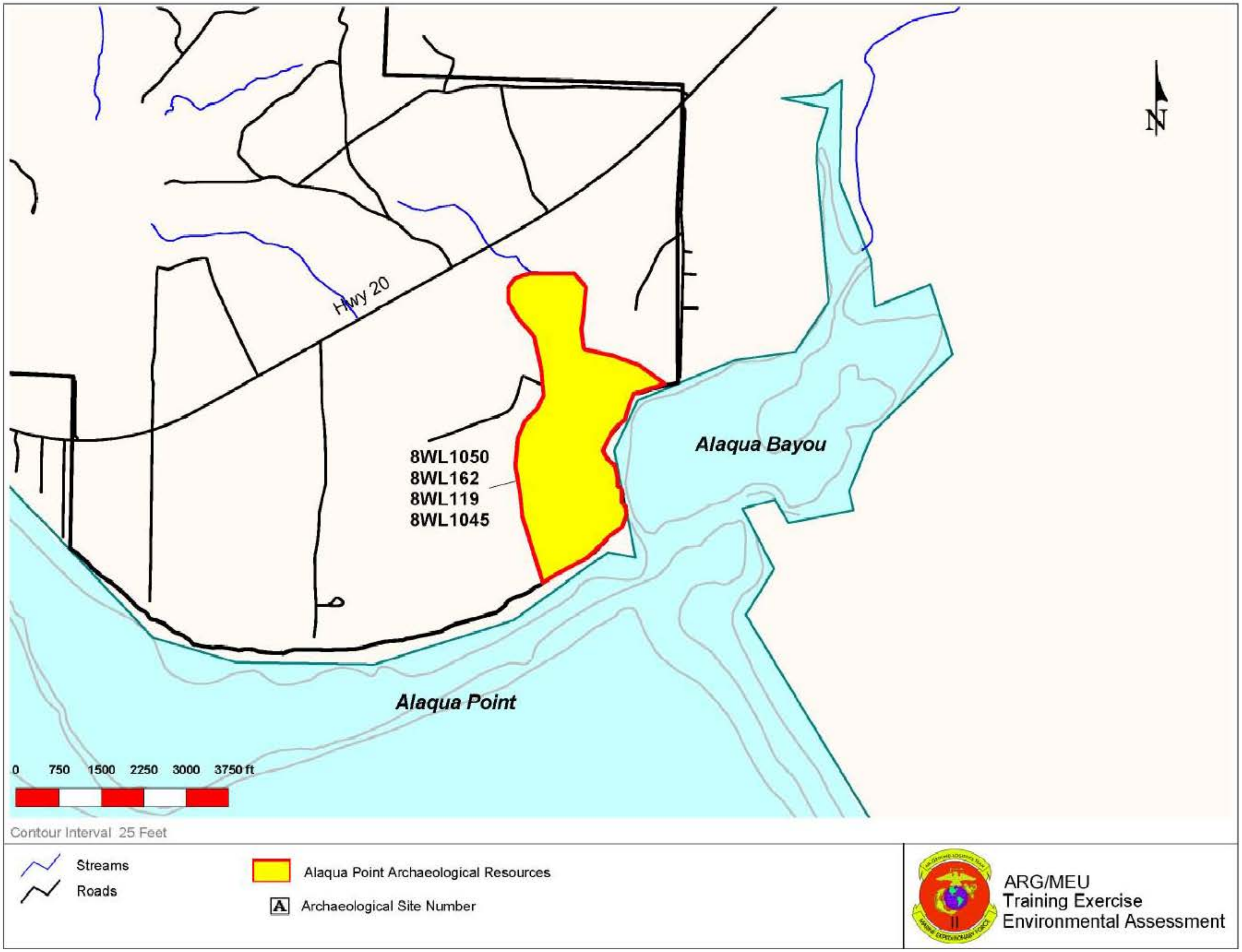

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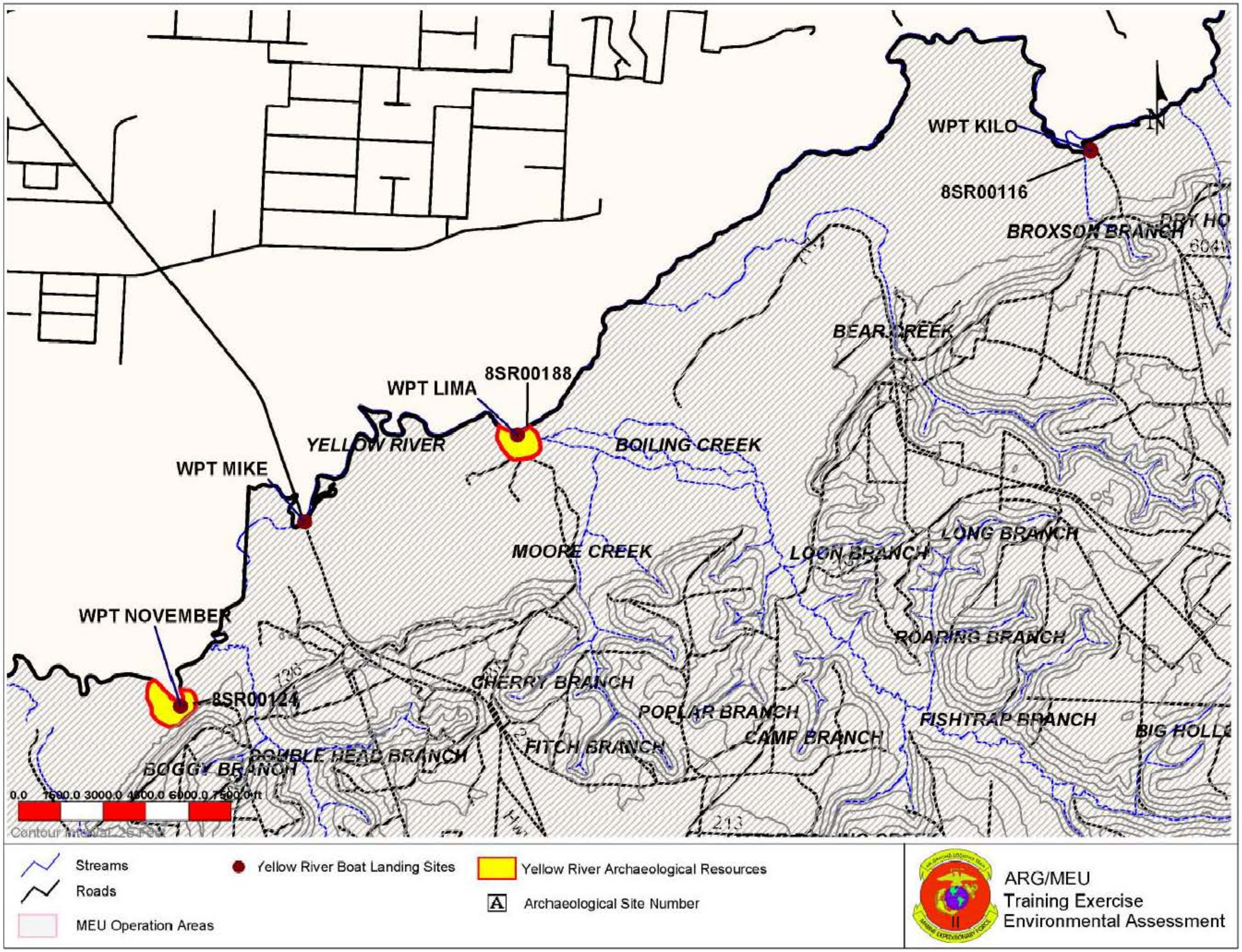

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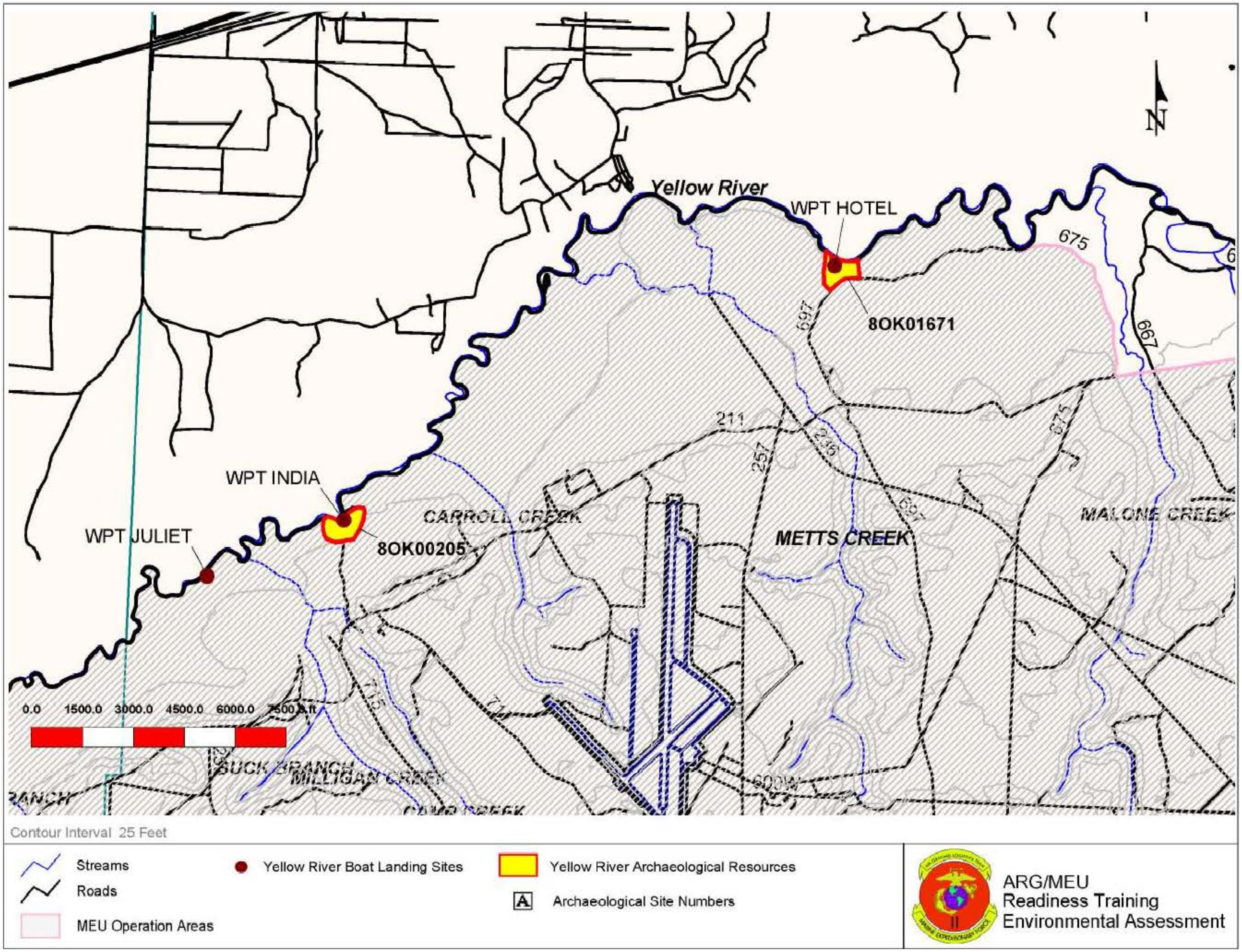

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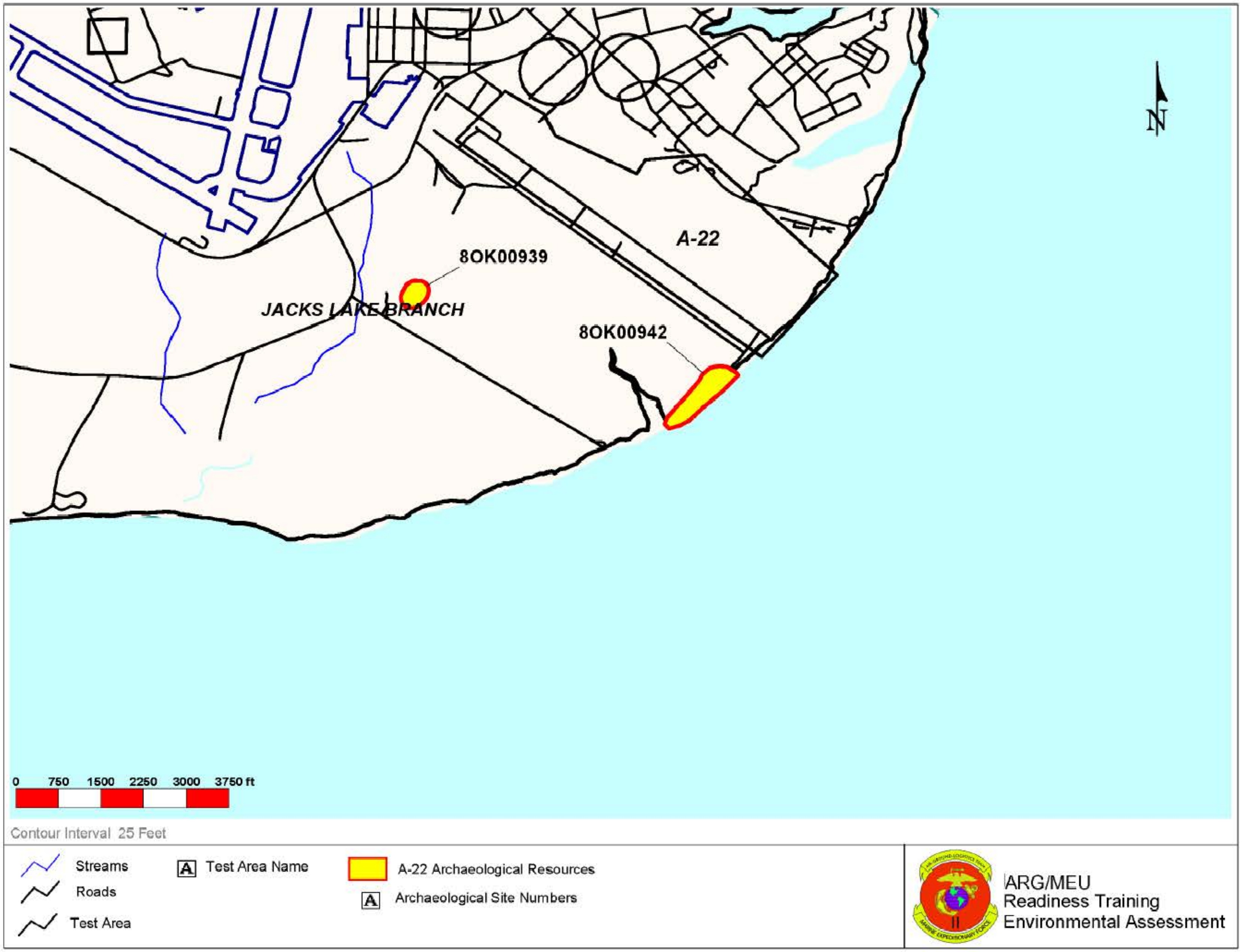

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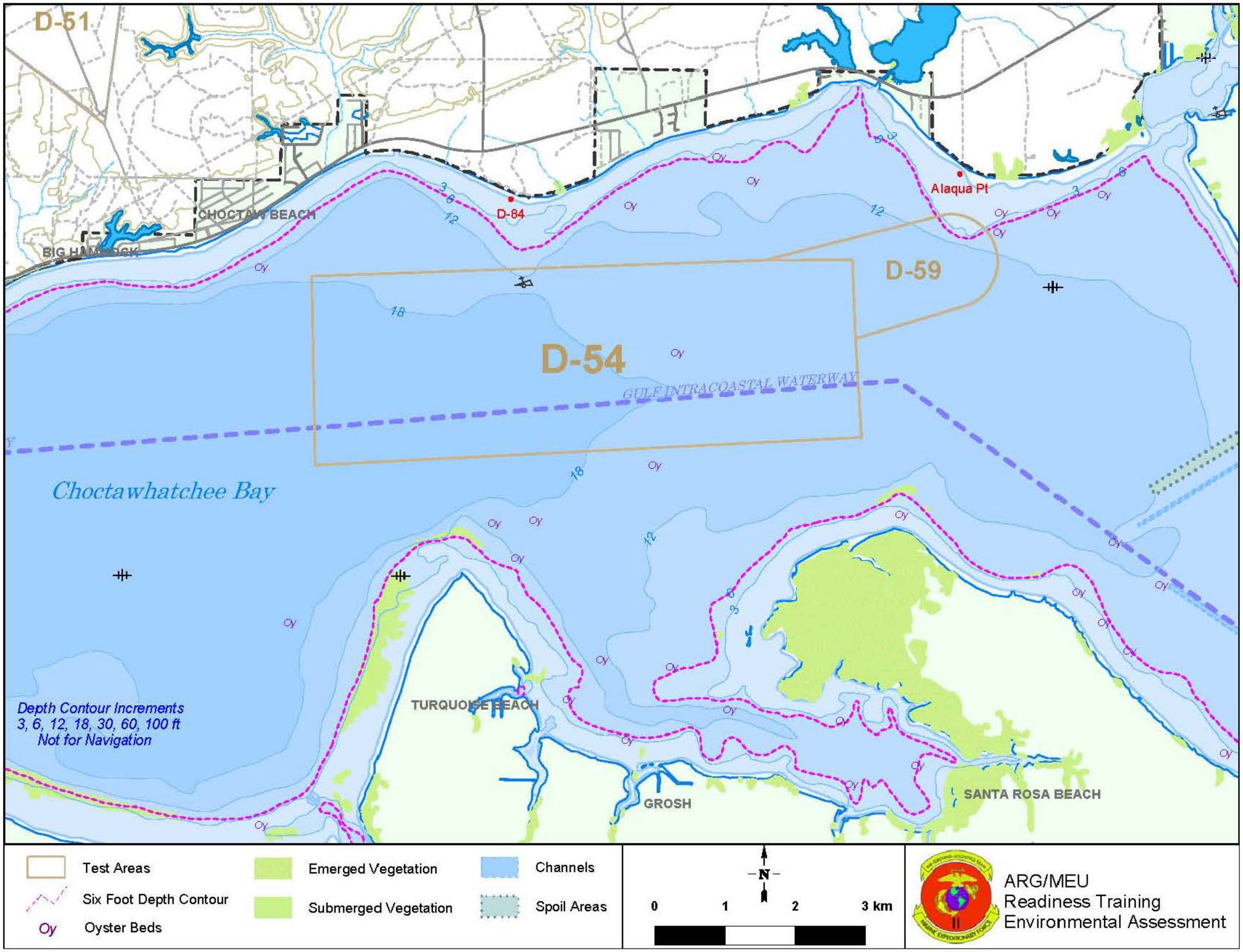

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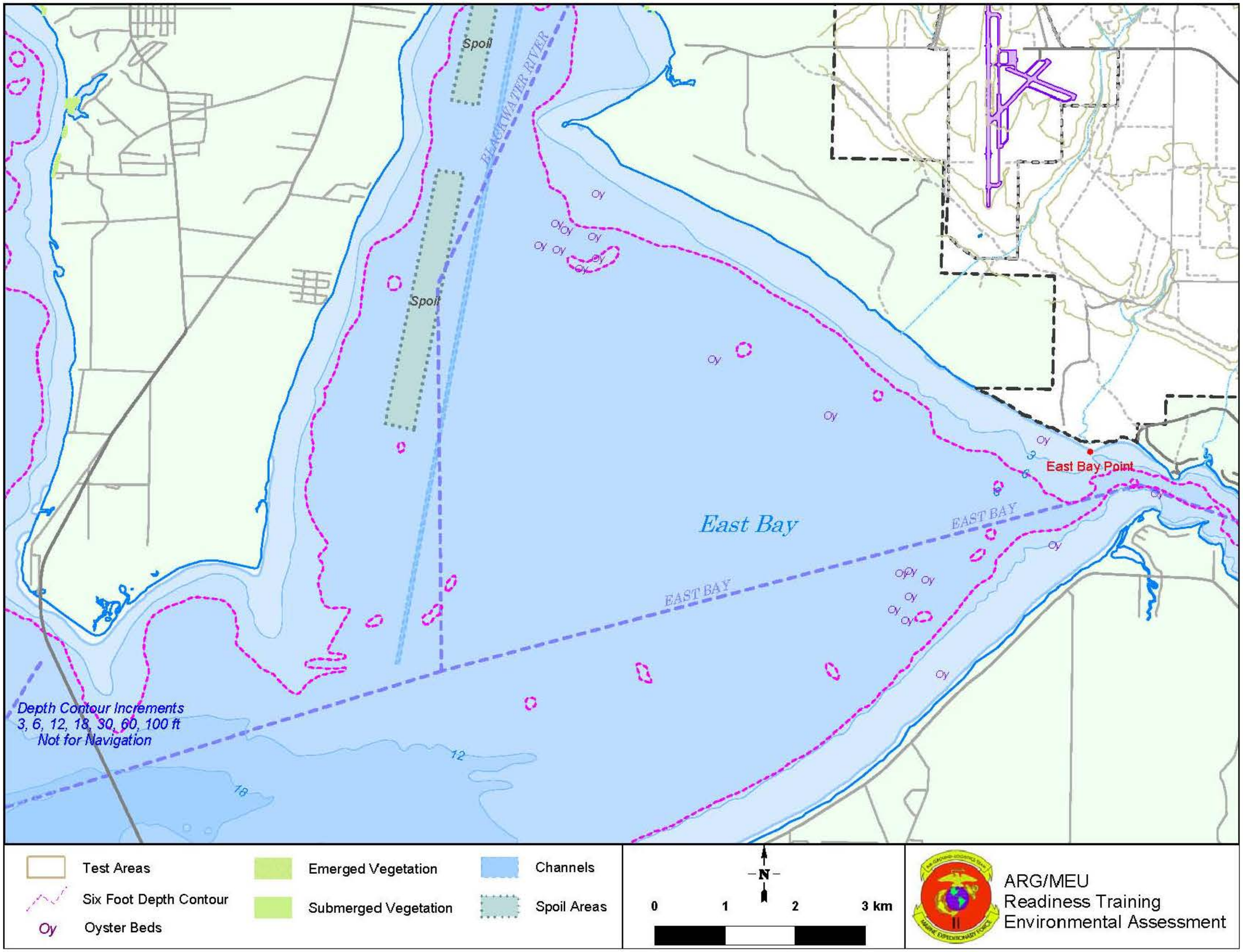

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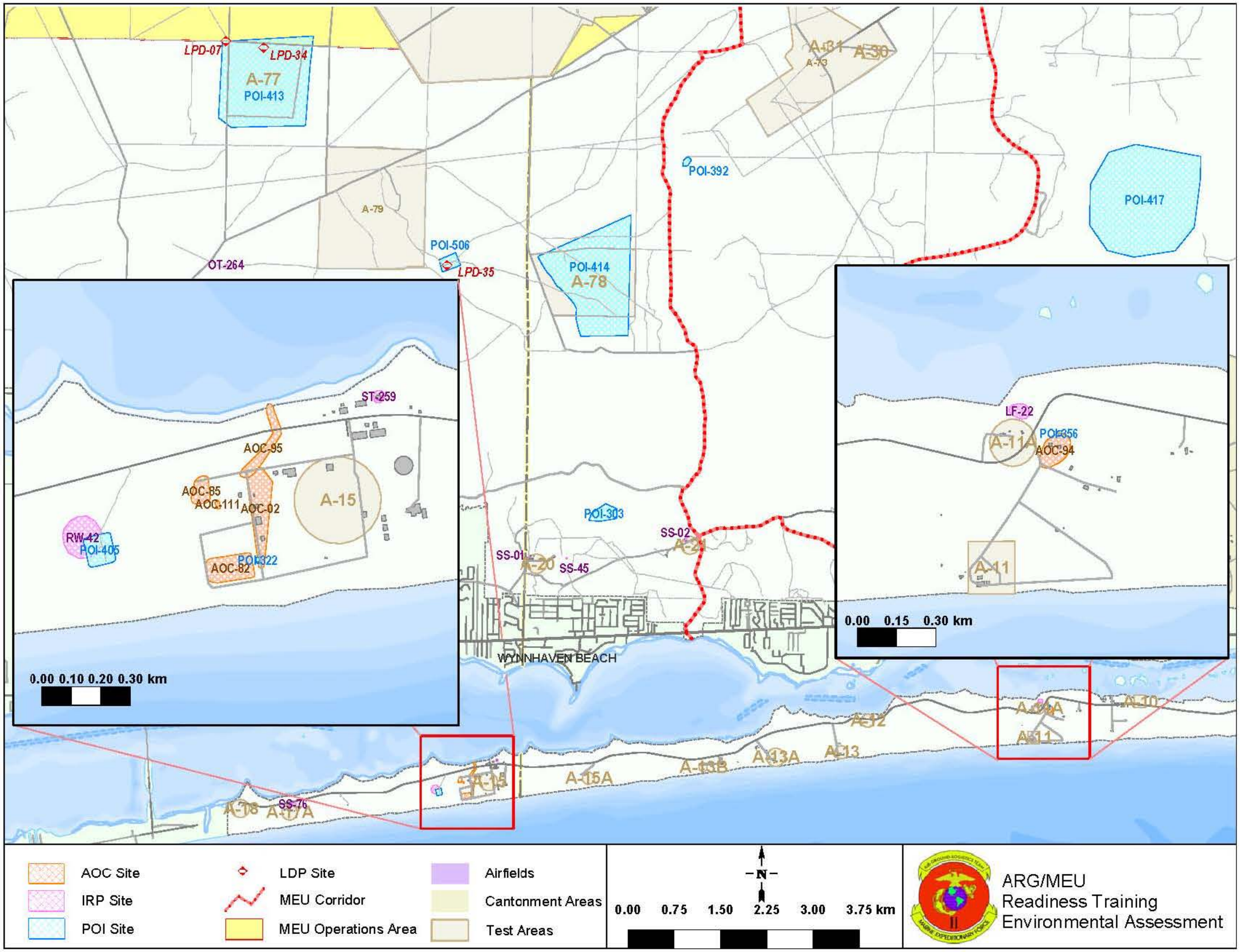

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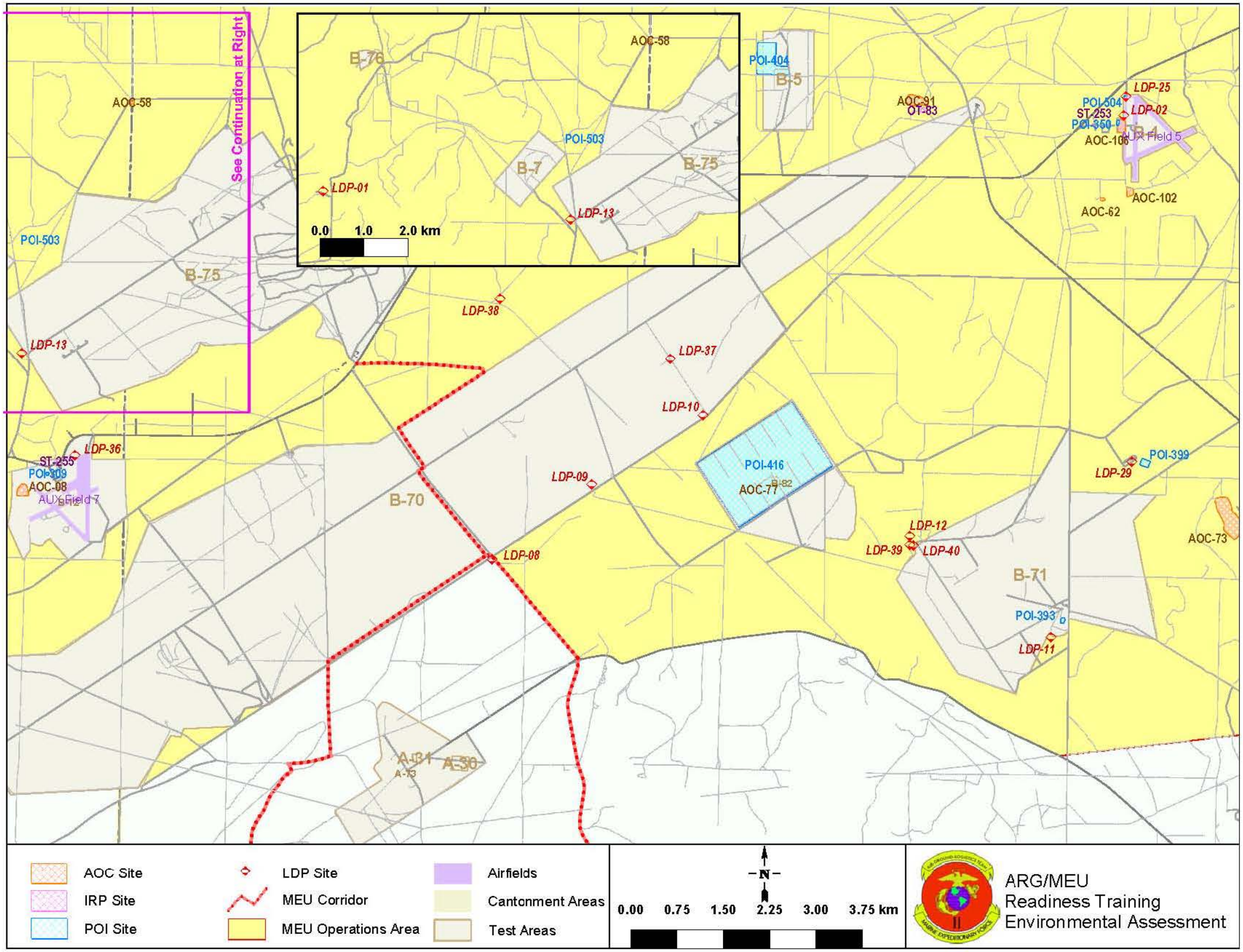

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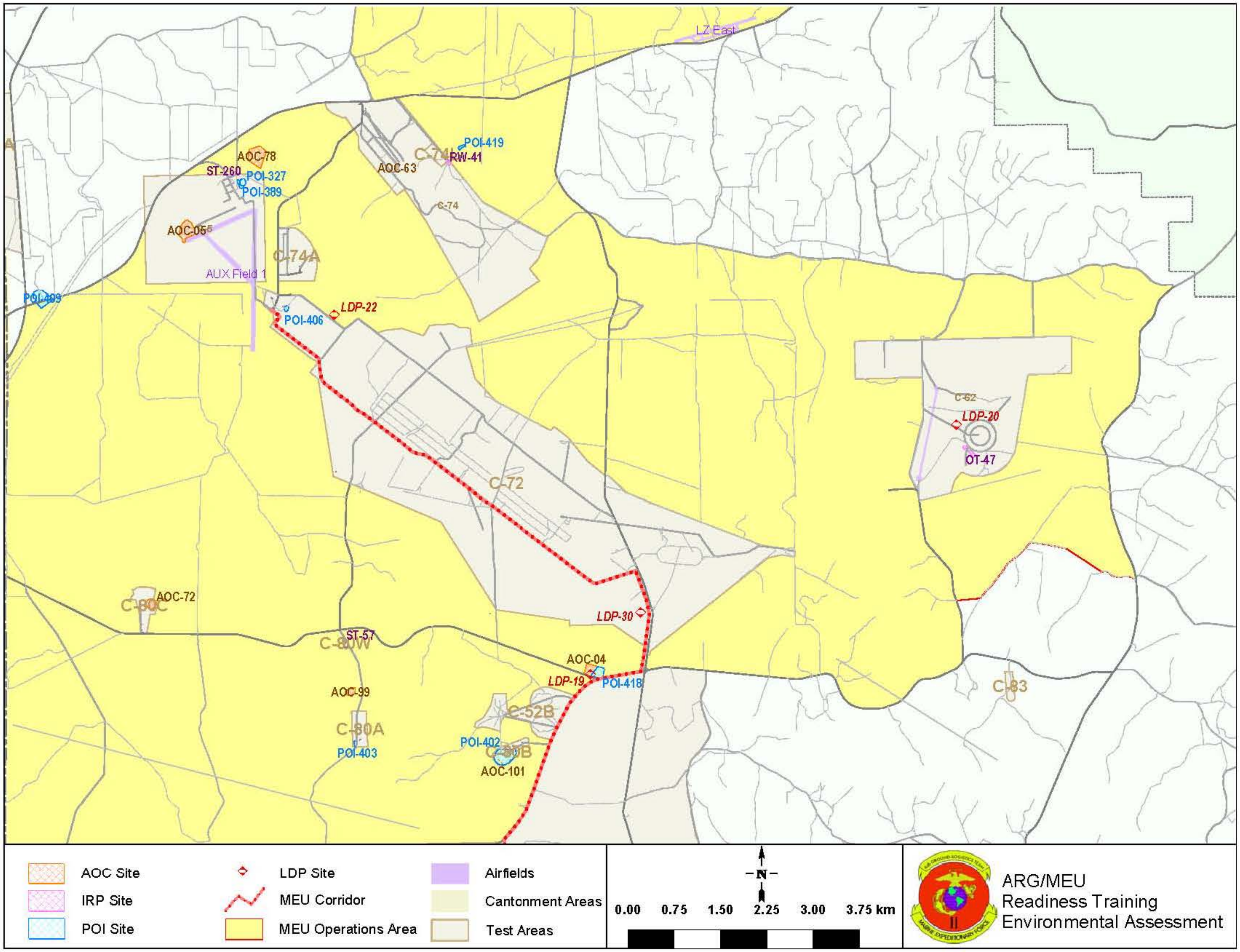

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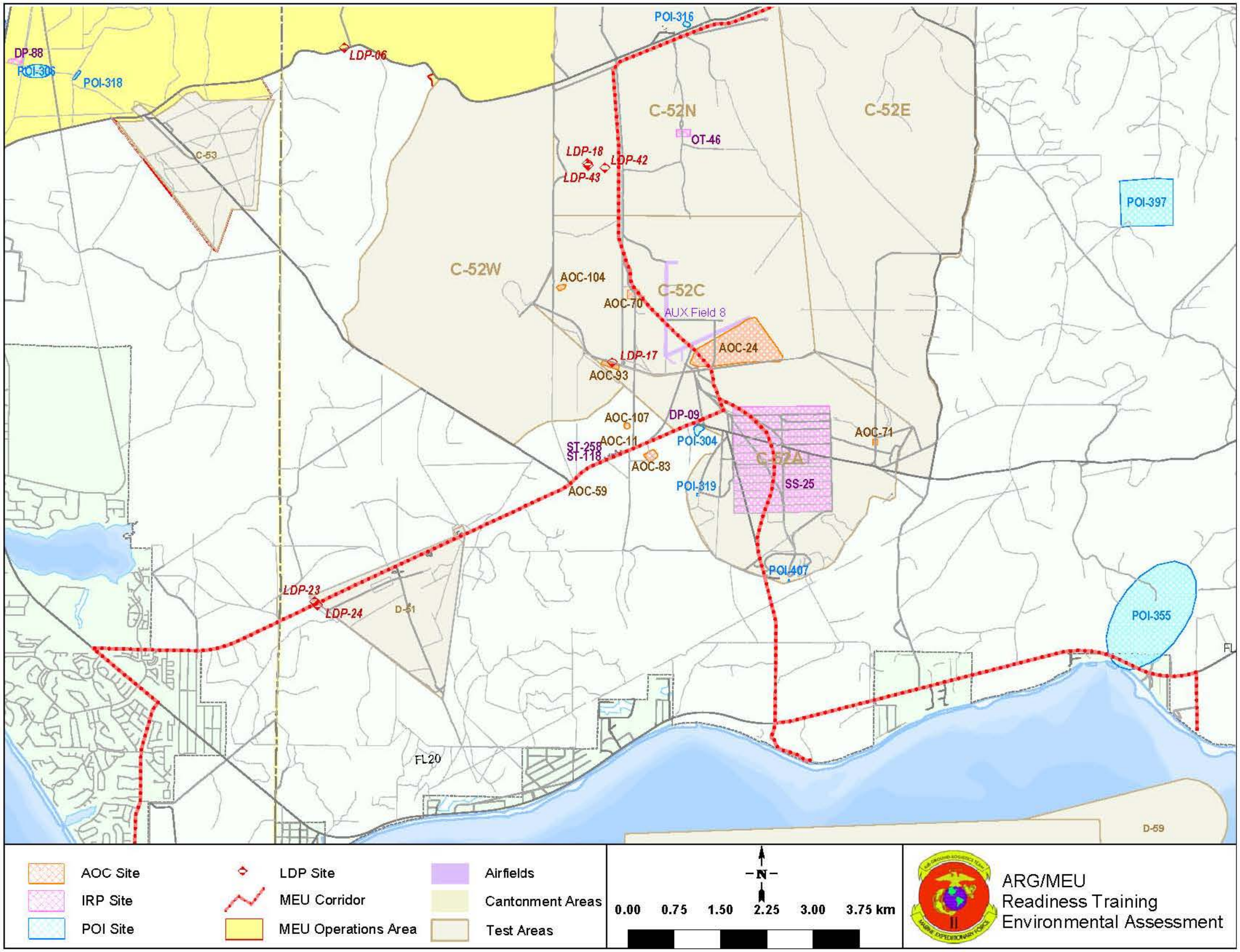

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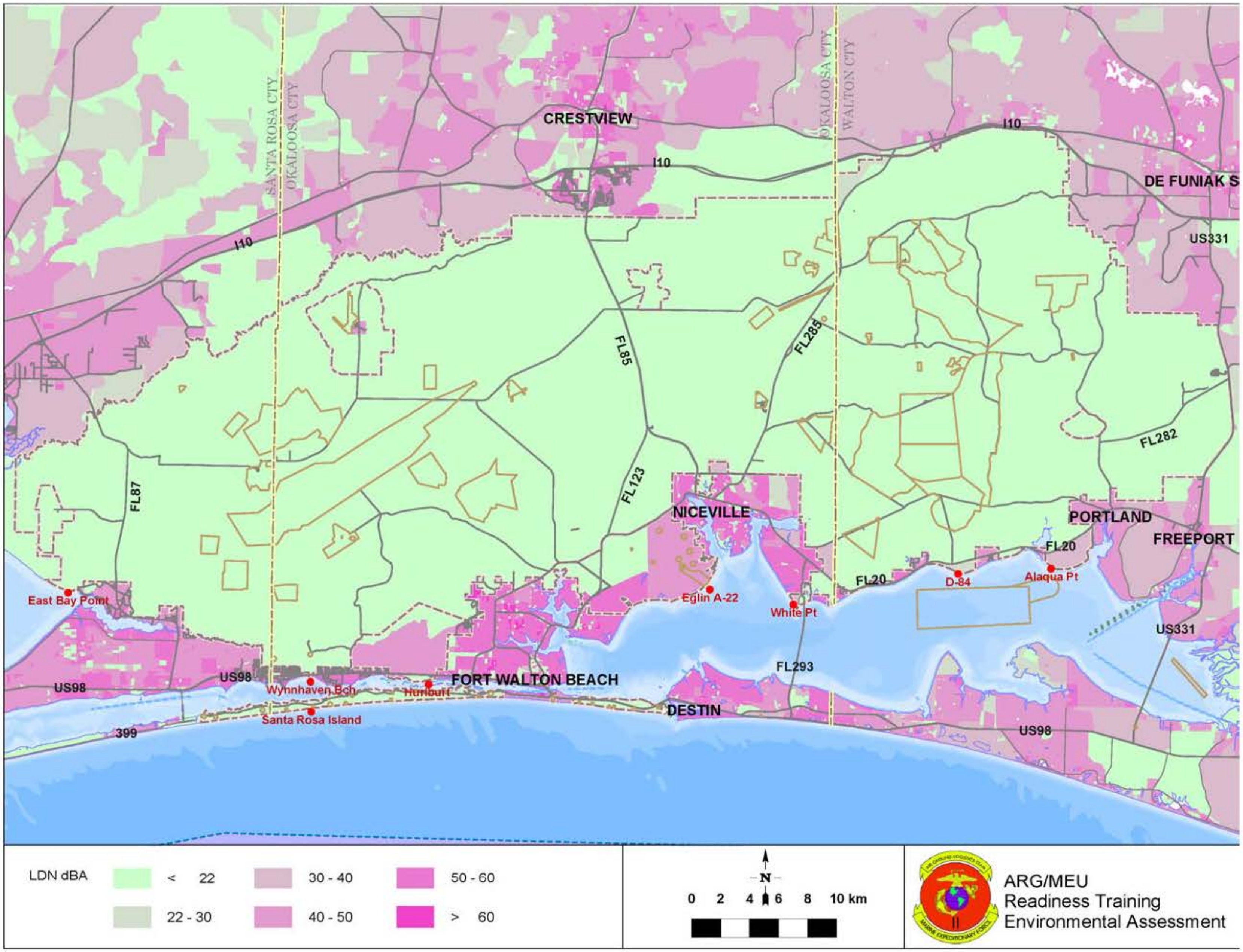

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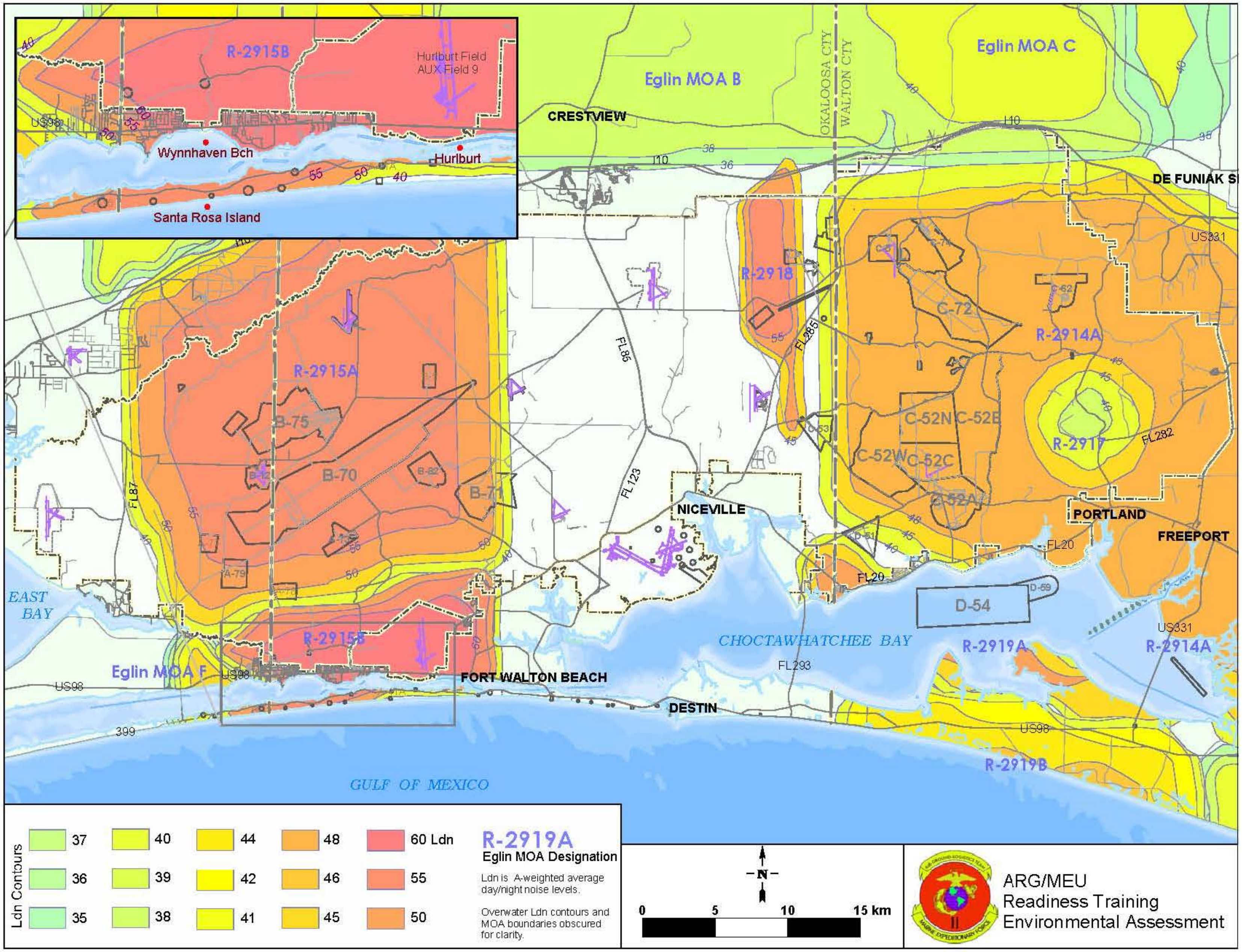

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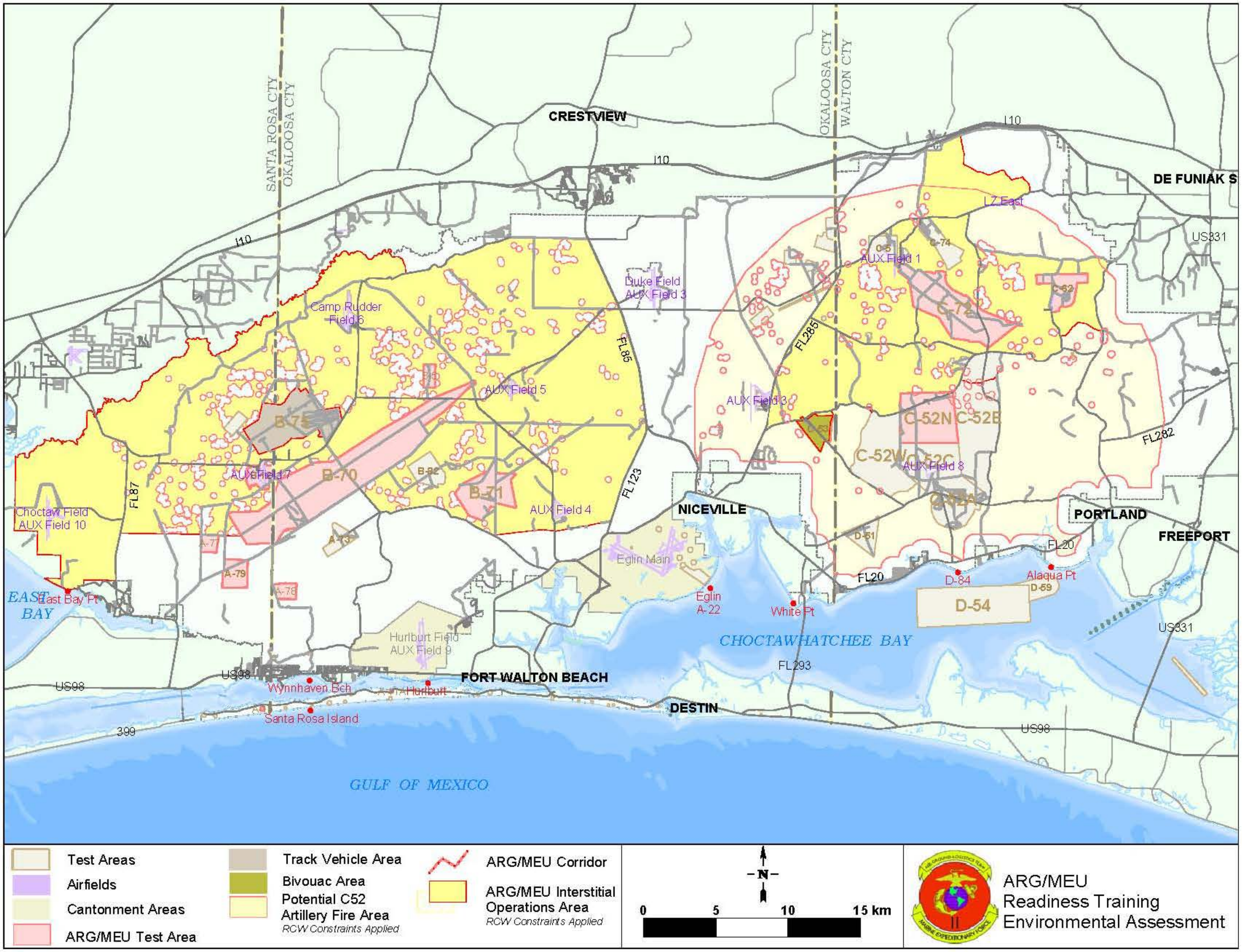

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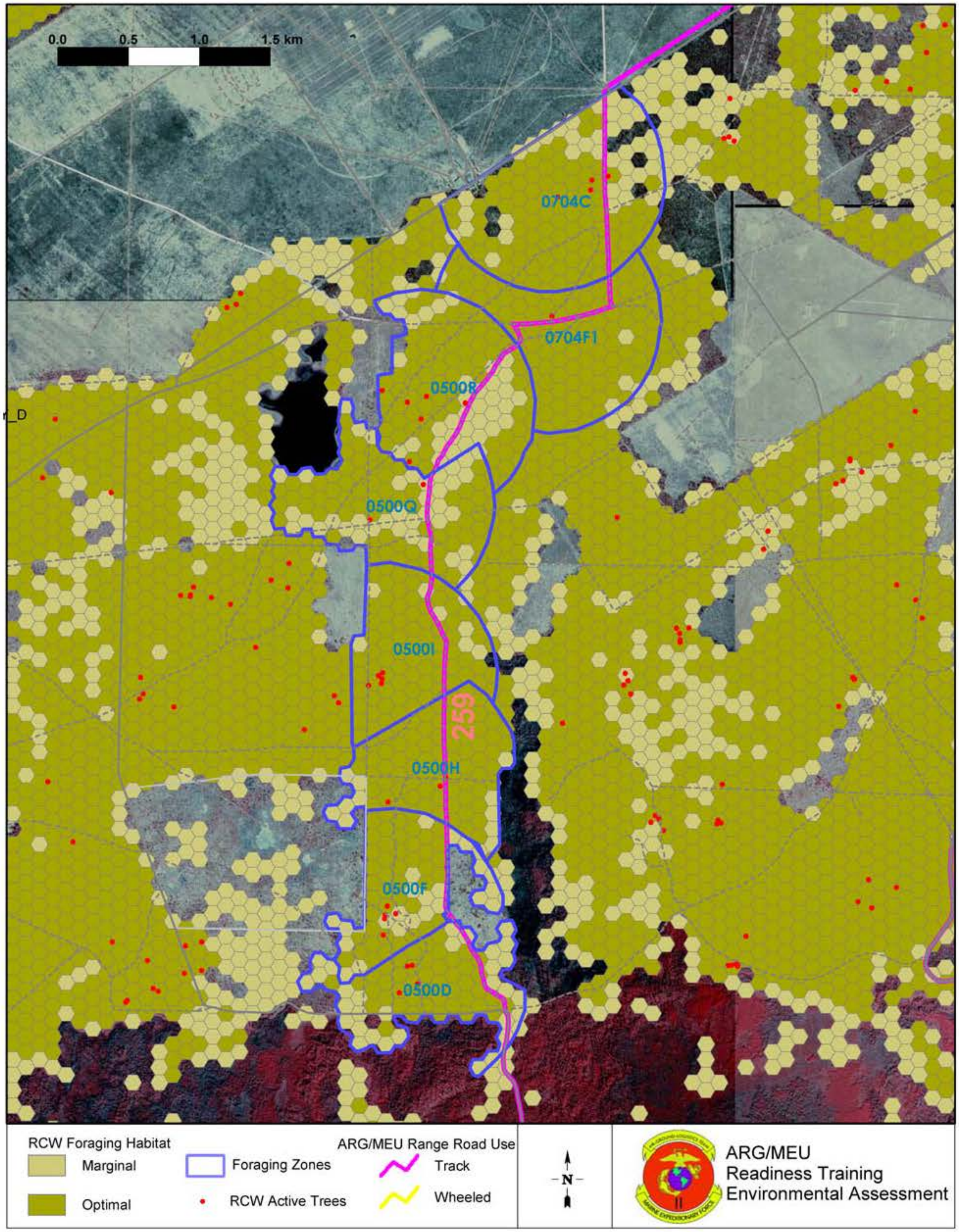

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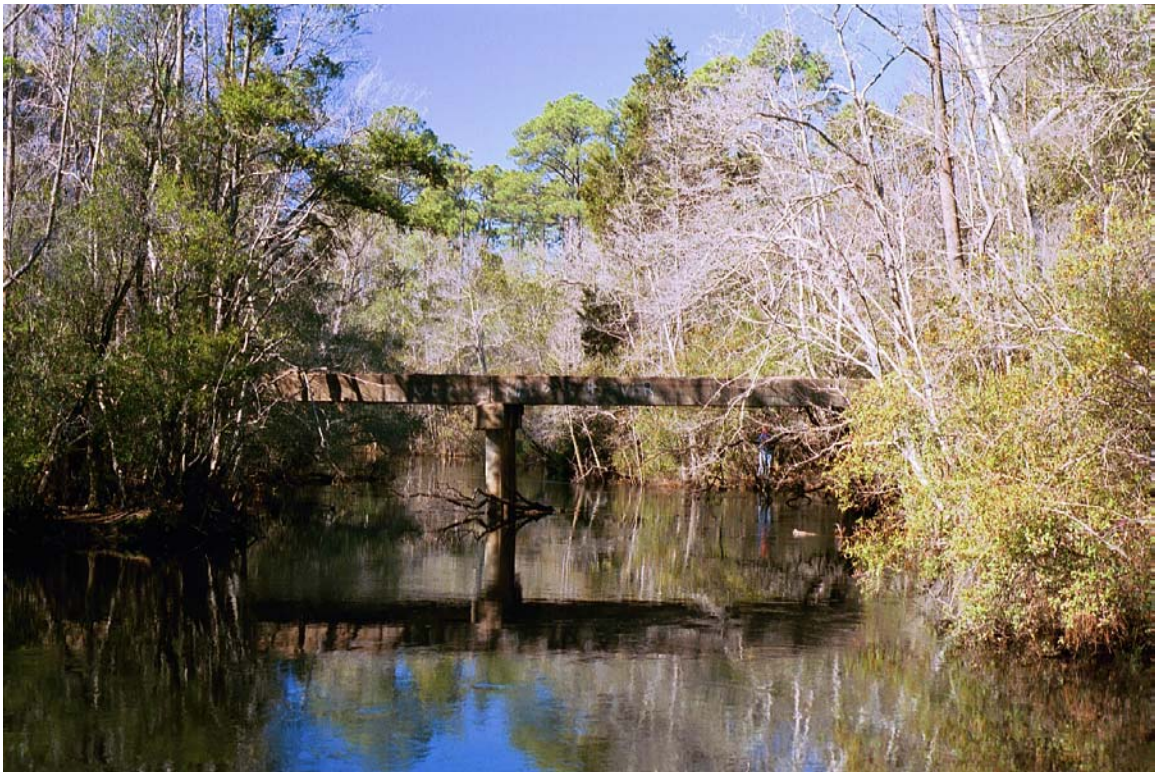

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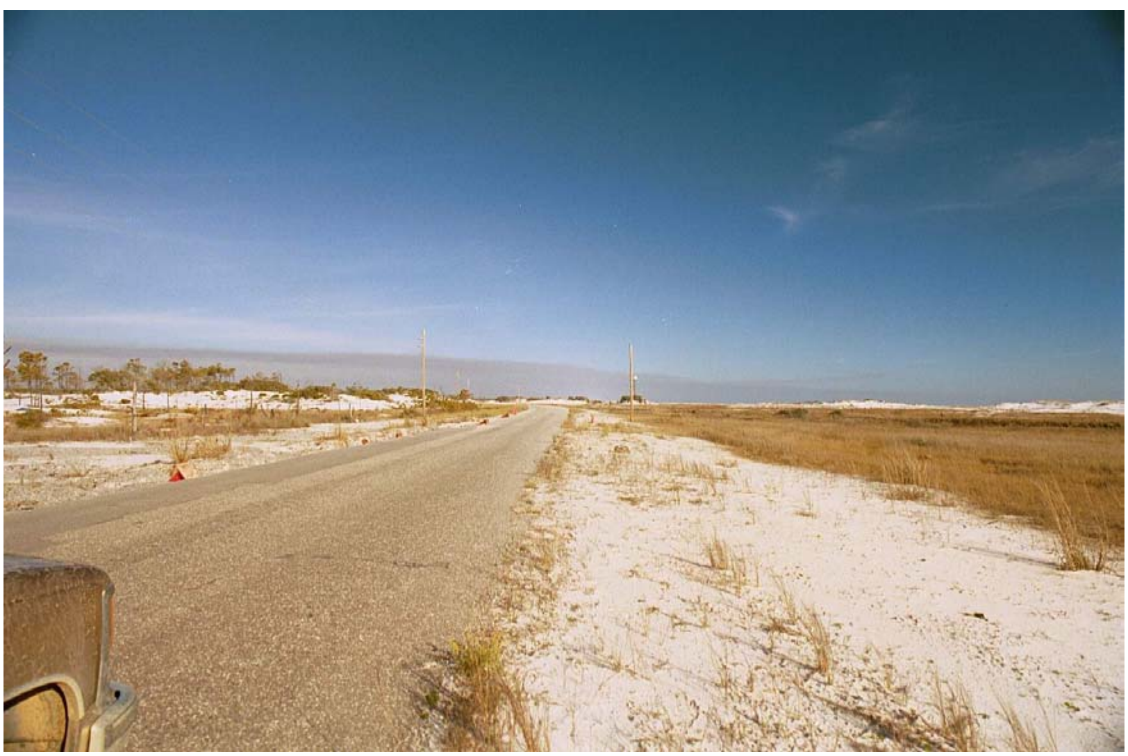

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APPENDIX C

NATIONAL MARINE FISHERIES SERVICE

Informal Endangered Species Act Section Seven Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fisheries Habitat Consultation

for

Amphibious Ready Group/Marine Expeditionary Unit Readiness Training at Eglin AFB, FL

Biological Assessment to Determine Impacts to Federally Listed Species and Essential Fisheries Habitat Resulting from Amphibious Ready Group/Marine Expeditionary Unit Readiness Training at Eglin Air Force Base, Florida

1. Introduction

This document serves as the basis for initiating discussions with the National Marine Fisheries Service (NMFS) and commencing the informal consultation procedures under the Endangered Species Act (ESA) and the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA). Briefly, this report addresses potential impacts to federally listed threatened and endangered (T&E) sea turtle species within Gulf of Mexico waters associated with Amphibious Ready Group/Marine Expeditionary Unit (ARG/MEU) readiness training activities at Eglin Air Force Base (AFB), Florida, as well as essential fish habitat (EFH). This biological assessment (BA), conducted by Eglin's Natural Resources Management Branch (AAC/EMSN), is meant to initiate the informal consultation process with the NMFS pursuant to Section 7 of the ESA and the requirements of the MSFCMA. The objectives of this BA are to:

- Document all federally listed T&E sea turtle species and EFH that occur, or may potentially occur, within the Eglin Gulf Test and Training Range (EGTTR), the near-shore waters of the Gulf of Mexico, Santa Rosa Sound, and the bays and estuaries surrounding Eglin AFB.
- Identify the ARG/MEU training activities, as described in the Environmental Assessment (EA), that have the potential to impact, either beneficially or adversely, those documented species.
- Determine and quantify to the extent possible what effects these activities would likely have on federally listed species.

Potential impacts to listed species and habitat from ARG/MEU training activities are strictly associated with ship-to-shore movement of amphibious craft. Impacts to marine mammals are not anticipated from ARG/MEU activities in the Gulf, as these activities would take place within no more than six nautical miles from Santa Rosa Island (SRI). As a result, impacts to marine mammals and the Marine Mammal Protection Act are not addressed in this document.

This BA is a tiered document, utilizing the ARG/MEU EA as a reference for pertinent information.

2. Proposed Action

As described in Chapters 1 and 2 of the ARG/MEU EA, the Proposed Action involves the development of a training capability for ARG/MEU training at Eglin AFB in order to maximize training opportunities for the U.S. Marine Corps prior to deployment. The Proposed Action is, therefore, to conduct ARG/MEU readiness training at Eglin AFB.

The training is anticipated to occur twice per year, with each training event having a total duration of 10 days, or less if only a portion of the activities is conducted. It is possible that the training could only occur once during some years and possibly not at all in others. This BA will assess the impacts associated with training occurring at a maximum level of twice per year, with the understanding that it may occur less. As stated previously, only ship-to-shore movements of amphibious vehicles are of concern in this document. The following is a summary list of the proposed training activities that involve the use of amphibious craft:

- Insertion of Forward Command Element
- Insertion of Reconnaissance And Surveillance (R&S) Teams
- Ship Operations
- Small Boat Raids
- Amphibious Landing Rehearsal
- Mechanized Raid (Wet)
- MEU Landing
- Direct Action
- Withdrawal

Amphibious landings: This is the ship-to-shore movement of landing crafts (landing craft air cushion [LCAC] and landing craft utility [LCU]), amphibious assault vehicles (AAVs), and small boats (Zodiacs). The landing crafts are used to transport all nonamphibious vehicles along with other equipment and troops.

A complete description of each activity is given in Chapter 2 of the ARG/MEU EA, while Tables C-1 and C-2 provide a summary of the locations of each training activity involving amphibious transport and training activity related equipment.

3. Relevant Federal Regulations

The purpose of the ESA of 1973, as amended, is to protect fish, wildlife, and plant species currently in danger of extinction and those species that may become so in the foreseeable future (U.S. Department of Commerce, 1993). The ESA states that "…it is unlawful for any person subject to the jurisdiction of the United States to…***take*** any such species within the United States or the territorial sea of the United States" or "***take*** any such species upon the high seas" (West Publishing Co., 1993). The term ***take*** is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or to attempt to engage in any such conduct" (West Publishing Co., 1993). Each federal agency is required to review its actions at the earliest possible time to determine whether any action it authorizes, funds, or carries out may affect listed species or critical habitat. If such a determination is made, consultation with the appropriate agency is required.

Table C-1. Training Activity Locations

Location	Training Activity								
	FCE	**R&S**	**SBR**	**ALR**	**MRW**	**MEU**	**DA**	**NEO**	**Withdrawal**
Geographic Locations									
Gulf of Mexico	✔	✔	✔	✔	✔	✔	✔	✔	✔
Yellow River		✔	✔						
East Bay River		✔	✔						
Choctawhatchee Bay	✔	✔	✔		✔	✔		✔	✔
Santa Rosa Sound	✔	✔	✔	✔	✔	✔	✔	✔	✔

FCE = Insertion of Forward Command Element
R&S = Insertion of Reconnaissance and Surveillance Teams
SBR = Small Boat Raid
ALR = Amphibious Landing Rehearsal
MRW = Mechanized Raid Wet
MEU = MEU Landing
DA = Direct Action
NEO = Non-combatant Evacuation Operation

Table C-2. Training Activity Related Equipment

Training Activity	Equipment			
	Amphibious Landing			
	LCAC	LCU	AAV	Zodiac
Insertion of Forward Command Element	✔	✔		
Insertion of R&S Teams	✔			✔
Small Boat Raid	✔			✔
Amphibious Landing Rehearsal	✔	✔	✔	
Mechanized Raid Wet	✔	✔	✔	
MEU Landing	✔	✔	✔	
Major Highway Crossing			✔	
Direct Action				✔
Non-combatant Evacuation Operation		✔		
Withdrawal	✔	✔	✔	

The U.S. Fish and Wildlife Service (USFWS) and the NMFS share responsibilities for administering the Act, with NMFS generally coordinating ESA activities for marine and anadromous species (e.g., sturgeon) and the USFWS coordinating ESA activities for terrestrial and freshwater species. ESA responsibilities regarding sea turtles are further split between the two agencies; NMFS coordinates activities that could impact sea turtles in aquatic settings, and USFWS oversees activities that could impact nesting turtles and turtle nest sites on beaches (NMFS, 1997). Activities within the EGTTR are strictly aquatic. Thus, consultation with NMFS is applicable in this situation.

The 1996 amendments to the MSFCMA require, among other things, that the NMFS and regional Fishery Management Councils designate essential fish habitat (EFH) for species included in a fishery management plan. EFH is defined as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. Federal agencies that fund, permit, or carry out activities that may adversely affect EFH are required to consult with the NMFS regarding potential impacts and respond in writing to NMFS and Fishery Management Council recommendations. Adverse impacts are defined as impacts that reduce quality and/or quantity of EHF and may include contamination, physical disruption, loss of prey, and reduction in species' fecundity.

4. Location and Setting Description

Eglin AFB

The Eglin Military Complex is located in northwest Florida and comprises 724 square miles of land area and approximately 130,000 square miles of airspace overlying both land and water ranges (Figure 1-1 of the ARG/MEU EA). Eglin is the nation's premier center for the developmental testing of conventional weapons. Eglin's mission as a major research, development, test, and evaluation facility includes the full spectrum of testing and evaluation of non-nuclear munitions and electronic combat, navigation, guidance systems, and C4ISR systems (Command, Control, Communications, Computers, Intelligence, and Surveillance/ Reconnaissance Systems). Eglin also supports numerous training activities involving ground troop maneuvers, air operations, and special operations.

Eglin Gulf Test and Training Range

The EGTTR encompasses approximately 86,000 square miles within the Gulf of Mexico (GOM) and consists of the airspace over the GOM, which is scheduled and operated by Eglin Air Force Base. The EGTTR is composed of Warning Areas W-151, W-168, and W-470, as well as the Eglin Water Test Areas (EWTA)-1 through EWTA-6. This airspace description is defined in a Federal Aviation Administration (FAA) Letter of Agreement between the Jacksonville, Houston, and Miami Air Route Traffic Control Centers, Training Air Wing Six, and the Air Force Development Test Center (AFDTC), dated 25 May 1995. Figure 1-1 of the ARG/MEU EA identifies the EGTTR with respect to other airspace regions within the eastern GOM.

5. Species and EFH Descriptions

Species Descriptions

Table C-3 lists the federally listed threatened and endangered species associated with the EGTTR (excluding the Gulf sturgeon, which is covered in the USFWS Section 7 Consultation document) addressed in this BA.

Table C-3. Federally Listed T&E Species Associated with the Eglin Military Complex

Species		Federal Status	Location
Scientific Name	**Common Name**		
Caretta caretta	Atlantic loggerhead turtle	T	Gulf of Mexico
Chelonia mydas	Atlantic green turtle	E	
Dermochelys coriacea	Leatherback turtle	E	
Lepidochelys kempii	Kemp’s ridley turtle	E	
Eretmochelys imbricata	Hawksbill turtle	E	
Acipenser oxyrhynchyus desotoi	Gulf sturgeon	T	Gulf of Mexico, rivers, bays, estuaries

E = Endangered; T = Threatened

Loggerhead Sea Turtle

The loggerhead turtle (*Caretta caretta*) is federally listed as threatened worldwide and gained its status on July 28, 1978. Loggerhead nests in Florida account for 90 percent of all loggerhead nests in the United States. Their nesting sites are on the numerous barrier islands and beaches between the Florida Keys and the northern Gulf of Mexico. They are the most commonly seen sea turtle in the southeastern United States and may be found near underwater structures and reefs (USFWS, 1996). It was concluded (NMFS and USFWS, 1991) that the loggerhead turtle population is continuing to decline in the southeastern United States, and shrimping is thought to have played a significant role in this decline (USFWS, 1996). The diet of loggerheads consists of gastropods, mollusks, coelenterates, and cephalopods (NMFS and USFWS, 1991).

Genetic research has identified four loggerhead nesting subpopulations in the western North Atlantic: (1) the Northern Subpopulation, occurring from North Carolina to around Cape Canaveral, Florida; (2) South Florida Subpopulation, occurring from Cape Canaveral on Florida’s east coast to Sarasota on Florida’s west coast; (3) Northwest Florida Subpopulation, occurring at Eglin Air Force Base and the beaches near Panama City; and (4) Yucatán Subpopulation, occurring on the eastern Yucatán Peninsula, Mexico (Bowen, 1995; Bowen et al., 1993; Encalada et al., 1998). Data indicate that gene flow among these four regions is very low. If nesting females are extirpated from one of these regions, regional dispersal would not be sufficient to replenish the depleted nesting subpopulation.

Kemp’s Ridley Sea Turtle

The Kemp’s ridley (*Lepidochelys kempii*) turtle received the status of endangered, under the ESA, throughout its range on December 2, 1970. Adults have the most restricted distribution of any sea turtle and are usually confined to the Gulf of Mexico, while post-pelagic turtles may be found over crab-rich sandy or muddy bottoms. As hatchlings, the species presumably eat *Sargassum* (a floating seaweed) and small organisms associated with the floating *Sargassum*. Adults feed mainly on crabs (USFWS and NMFS, 1992).

Green Sea Turtle

The green sea turtle (*Chelonia mydas*) was listed as threatened on July 28, 1978, in all its eastern range of North America except in Florida, where it is listed as endangered. In the United States, it nests on southern Florida beaches with a few exceptions in the northern Gulf of Mexico and North Carolina (USFWS, 1996). Green turtles nest from May to August. Primarily a tropical herbivore, the juveniles are frequently found in the Gulf of Mexico in areas where there is an abundance of seagrass (USFWS, 1996).

Leatherback Sea Turtle

The leatherback sea turtle (*Dermochelys coriacea*) was originally listed as endangered on June 2, 1970. Leatherbacks are a migratory species with a worldwide distribution. This species nests in the tropics but may range as far north as Canada and the northern Pacific. In the United States, nesting occurs in Florida, beginning in February (USFWS, 1996). The leatherback feeds primarily on jellyfish but occasionally will eat sea urchins, squid, crustaceans, tunicates, fish, blue-green algae, and floating seaweed (USFWS, 1996).

Hawksbill Sea Turtle

The hawksbill sea turtle (*Eretmochelys imbricata*) was originally listed as endangered on June 2, 1970. It remains endangered as listed by the state of Florida and the USFWS under the ESA (USFWS 1990; NMFS and USFWS 1995; USFWS 1996). Severe population declines have occurred throughout the western Atlantic and Caribbean. Continued illegal international trade in tortoise shell and use of hawksbill meat and eggs are a major threat to the turtles' survival. Though rare in northeastern Gulf waters, nesting for the hawksbill turtle has been reported along the Gulf coast and is seen with some regularity in the waters near the Florida Keys (MMS 1986; NMFS and USFWS 1993). Although mostly a spongivore, this species feeds on other invertebrates that encrust coral reefs (NMFS and USFWS 1993). Commercial exploitation is the major cause of the continued decline of the species (USFWS 1996).

Gulf Sturgeon

The Gulf sturgeon (*Acipenser oxyrinchus desotoi*) migrates from salt water into large coastal rivers to spawn and spend the warm months (Wordsworth Dictionary of Science and Technology, 1995). It lives predominately in the northeastern Gulf of Mexico, where it ranges from the Mississippi Delta east to the Suwannee River in Florida. However, it can be found in the bays and estuaries throughout this range (U.S. Coast Guard, 1996). Spawning takes place in fresh water, such as the Yellow River, which borders Eglin AFB along the northwest, during April through June (Paruka, 1996). Little is known about the offshore distance the Gulf sturgeon travels, but analyses of stomach contents suggest that feeding occurs as far as 20 miles offshore (Page and Burr, 1991; U.S. Coast Guard, 1996). The proposed rule for Gulf sturgeon critical habitat was published in the Federal Register in June 2002, but a final determination has not been made. In the area of interest, all of Choctawhatchee Bay, East Bay, Santa Rosa Sound, and the Yellow River are proposed as critical habitat.

EFH Descriptions

The Proposed Action would take place in the Gulf of Mexico and shallow water areas of Santa Rosa Island, Santa Rosa Sound, Choctawhatchee Bay, and the East Bay. Several of EFH types do not occur in these areas and, therefore, may be omitted from consideration. The habitat types that are absent include hard bottom areas, reefs, coral reefs, ledges, rocks, outcrops, mangrove wetlands, and shell substrate. In addition, pelagic habitat will not be considered. Pelagic species may move from inshore to open Gulf waters and up and down the coast with the seasons. Activities associated with the Proposed Action would only occur at or near the shoreline, with the exception of transitory vessel movement from larger ships offshore. EFH identified by the NMFS, and associated species within the area encompassed by the Proposed Action are presented in Table C-4.

Table C-4. Managed Species for Which Essential Fish Habitat Has Been Identified for the Proposed Action

Species	Life Stages	Habitat
Stone crab	Juvenile	Shell, SAV
	Adult	Shell, SAV, coral
Black grouper	Juvenile	Estuarine and Gulf of Mexico
Cobia	Postlarvae/juvenile	Coastal and shelf
	Adult	Coastal and shelf
Gag grouper	Juvenile	SAV and oyster beds in lagoons and estuaries
Greater amberjack	Juvenile	Sargassum, debris
	Adult	Pelagic over reefs, wrecks
Gray snapper	Postlarvae/juvenile	SAV, mangrove, mud
	Adult	SAV, mangrove, sand, mud
Gray triggerfish	Eggs	Sand
	Larvae	Sargassum, debris
	Postlarvae/juvenile	Sargassum, debris
Lane snapper	Juvenile	SAV, mangrove, sand, mud
	Adult	Reefs, sand 0 – 130 m
Lesser amberjack	Juvenile	Sargassum, debris
Red drum	Post larvae/juvenile	SAV, estuarine
	Subadult	Estuarine, mud bottoms, oyster reefs
	Adult	Mud bottoms, oyster reefs
Red grouper	Juvenile	Hard bottom, SAV, reefs
Red snapper	Larvae	Structure, sand/mud, 17 – 183 m
	Postlarvae/juvenile	Structure, sand/mud, 17 – 183 m
Spanish mackerel	Juvenile	Offshore, beach, estuarine
Yellowtail snapper	Juvenile	SAV, mangrove, sand, mud

Source: Gulf of Mexico Fishery Management Council, 1998; NOAA, 1985; National Marine Fisheries Service, 2002.
m = meters
SAV = submerged aquatic vegetation

Emergent Vegetation

In some Gulf of Mexico estuarine systems, the breakdown of emergent vegetation forms the basis of the detrital food web, supplying many parts of the system with nutrients (Wolfe et al., 1988). In addition to supplying nutrients to the estuarine system, marsh grasses provide habitat for many birds, invertebrates, and fish; prevent erosion; absorb surface water; and act as a filter for agricultural and industrial pollutants (Field et al., 1991). Florida panhandle marshes typically support *Juncus roemerianus* (black needlerush), *Spartina* sp. (smooth cordgrass), *Distichlis spicata*, *Scirpus* spp., *Salicornia* spp., and *Phragmites australis* among others (Wolfe et al., 1988). Field verification of areas of highly concentrated marsh vegetation revealed the dominant species in Choctawhatchee Bay to be the salt-tolerant perennial *Juncus roemerianus* (Livingston, 1986); *Spartina alterniflora* was also documented. Compared to other Gulf Coast estuaries, Choctawhatchee Bay has relatively little emergent vegetation and, therefore, exhibits low productivity in some areas (Livingston, 1986). Emergent vegetation in Choctawhatchee Bay is estimated to cover an approximated 2,700 acres (NOAA, 1991). Salt marsh occurs at the interface of Santa Rosa Island and Santa Rosa Sound. Emergent vegetation is shown in Figures A-41 through A-47 of Appendix A.

Seagrasses

Submerged vegetation (e.g., seagrasses) is a major component of productive coastal estuaries, equal in importance to marsh grass ecosystems. Seagrass communities provide sediment stabilization, primary production, detrital and nutrient production, habitat, nursery foraging grounds, and protection for many species of fish, turtles, and invertebrates (Livingston, 1986; Dawes, 1987; and Wolfe et al., 1988). Two species of submerged vegetation have been documented in Choctawhatchee Bay: *Halodule wrightii* (Cuban shoalgrass) and a freshwater species, *Ruppia maritima* (widgeon grass). Widgeon grass is most common in brackish waters but can tolerate higher salinities (Dawes, 1987). Cuban shoalgrass has been characterized as rather tolerant of environmental stresses, withstanding heat, desiccation, and turbidity with greater success than other Florida species (Dawes, 1987). Populations of shoalgrass occur primarily west of the county line in the vicinity of Moreno Point, Joe’s Bayou, East Pass, Santa Rosa Sound entrance, Black Point, and White Point (Burch, 1983 and Livingston, 1986). Widgeon grass occurs at Hogtown Bayou, east of the Okaloosa-Walton county line (Burch, 1983). The Florida Marine Research Institute estimates seagrass coverage in Choctawhatchee Bay and the Okaloosa County portion of Santa Rosa Sound at 4,160 acres (Sargent et al., 1995). The seagrass bed nearest to any of the activities occurs approximately 3,000 feet to the east of Wynnhaven Beach. Seagrass does not occur in East Bay near the study area. The habitat on the Gulf side of Santa Rosa Island is a sandy/silty substrate, which does not support large areas of seagrass beds. The nearest major seagrass bed in the Gulf of Mexico is located to the southeast of Cape San Blas, outside of the study area. Seagrass coverage was obtained from the Florida Marine Research Institute Marine Resources Geographic Information System (FMRI, 1995) and is illustrated in Appendix A, Figures A-41 through A-47.

Oyster Reefs

Oyster reefs are ecosystems formed from aggregations of live oysters, oyster shells, and other organisms growing on accumulations of generations of oyster shell substrate (Wolfe et al., 1988). Oyster reefs are important to estuarine systems because they remove suspended particles from the water column, affect current patterns, filter out phytoplankton, and produce large quantities of oyster biomass. The reef structure provides habitat for algae, hydroids, bryozoans, barnacles, mussels, worms, sponges, and crabs (Wolfe et al., 1988), as well as some species of fish. In the proposed action area, oyster reefs occur in Choctawhatchee Bay and East Bay. The primary species and only commercially valuable bivalve is the American oyster, *Crassostrea virginica*. Oyster beds are located in the eastern half of Choctawhatchee Bay; however, the actual acreage of oyster shell beds is not known. Since 1957, over 8 million cubic yards of clam or oyster shell have been planted to encourage growth of oyster resources. Shells were planted in 1993 near Hammock Point. Oyster reef coverage in East Bay has been estimated to be 3,395 hectares (1,371 acres) (Wolfe et al., 1988).

Sargassum Community

Sargassum, or Gulfweed, a dominant genus in shallow waters, is a free-floating brown algae that is present in the tropics and subtropics including the Gulf. The *Sargassum* mats drift in oceanic eddies. These mats provide an important niche for numerous species and support a community of animals found nowhere else. Fishes occupying the upper water column (0 to 200 meters) use *Sargassum* clumps for food, while others lay their eggs in *Sargassum* (Adams, 1960; Bortone et al., 1977; Dooley, 1972; Smith, 1973). Between 1971 and 1976, 15 families and 40 species of fish were collected at 62 *Sargassum* locations within the eastern Gulf (Bortone et al., 1977). Sea turtle hatchlings also use *Sargassum* as a vehicle for passive migration and shelter (Collard and Ogren, 1990) and the abundance of invertebrate fauna that inhabit the mats is an important food source for sea turtles (Carr and Meylan, 1980; Carr, 1987). The biomass of *Sargassum* has been decreasing in the Gulf; some believe it is due to human pollutant sources, such as oil spills and contaminant transport (Stoner, 1983). It has been shown that *Sargassum* can accumulate hydrocarbons and some toxic metals (Burns and Teal, 1973; Johnson and Braman, 1975). A decrease in this resource could have adverse effects on the multitude of species that depend on it for survival.

Artificial Reefs

Artificial reefs consist of materials deposited on the ocean floor, usually for the purpose of enhancing fishing or other recreational activities. Artificial reefs provide bottom relief and habitat for fish and other marine species in areas that may otherwise be featureless. Although the material is often purposely deposited, shipwrecks are another source of reefs. The U.S. Army Corps of Engineers (USACE) regulates artificial reef construction in U.S. waters through its Permits and Evaluation Branch. Materials authorized by the USACE for reef construction include concrete and steel culverts, Army tanks and steel hulled or ferro cement vessels (without engines), construction-grade aluminum alloys and ferrous metals such as bridges, concrete blocks, slabs, natural limestone boulder size rocks, and similar material (USACE, 1995). A few

artificial reefs exist in Choctawhatchee Bay but are not in close proximity to any of the planned action areas. One artificial reef exists close to the landing points on the Gulf side of Santa Rosa Island (Figure A-38).

Gulf Sturgeon (Critical) Habitat

The USFWS and NMFS designated the Gulf sturgeon (*Acipenser oxyrhynchus desotoi)* as threatened under the ESA in 1991. The Gulf sturgeon occurs predominately in the northeastern Gulf of Mexico, inhabiting offshore areas and inland bays during the winter months and moving into freshwater rivers during the spring to spawn (USFWS and GSMFS, 1995). Migration into fresh water generally occurs from March to May, while migration into salt water occurs from October through November. Within the region of influence, sturgeon occur in the Yellow River in the spring and summer and in Choctawhatchee Bay, Santa Rosa Sound, and the Gulf of Mexico in the winter. Tracked Gulf sturgeon were found to be distributed nonrandomly within Choctawhatchee Bay in nearshore areas two to four meters deep, with a home range usually no more than one square kilometer. Occasionally, the sturgeon would travel further distances but generally remained in areas of sandy bottom sediments that contained an abundance of amphipod crustaceans and polychaete worms (Fox et al., 2000). Sturgeon were generally not found in seagrass beds. Distribution and area/habitat preference in Choctawhatchee Bay may be related to sturgeon age. Sub-adult sturgeon are located frequently in LaGrange and Alaqua Bayous, while adults seem to prefer Hogtown Bayou. Areas east of the Highway 331 Bridge are generally not used as winter habitat (USFWS, 2001, pers. comm.). Sturgeon have been found on both sides of the Mid-Bay Bridge but decrease in occurrence west to Fort Walton Beach.

Research on Gulf sturgeon in the Yellow River, supported in part by Eglin AFB, suggests that certain areas of the Yellow River may be potential summer refuge areas for sturgeon (Craft et al., 2001). Adult sturgeon have been found to congregate in relatively high numbers in these summer refuge areas, though their distribution is spread over the entire length of the Yellow River. Generally, the summer refuge areas are located in the southern part of the Yellow River adjacent to Eglin property. Heavy sediment loads and low water volume from drought conditions were identified as factors potentially affecting sturgeon migration in the Yellow River. Due to the low number of sturgeon observed in East Bay during the winter, Craft et al. (2001) theorize that the majority of sturgeon in that region migrate to the Gulf of Mexico during the winter months.

Gulf sturgeon feed on insects, crustaceans, mollusks, worms, and small fish (U.S. Coast Guard, 1996; Page and Burr, 1991). Ghost shrimp are thought to be an important prey item for adult sturgeon. Bottom-disturbing activities could significantly impact the Gulf sturgeon (USFWS, 2001, pers. comm.).

Under the ESA, the USFWS is to designate critical habitat for each listed species. Critical habitat is defined by the ESA as specific areas within or outside the geographical area occupied by the species that contain physical or biological features essential to the species' conservation, and that may require special management considerations or protection. The proposed rule for

Gulf sturgeon critical habitat was published in the Federal Register in June 2002, but a final determination has not been made. In the area of interest, all of Choctawhatchee Bay, East Bay, Santa Rosa Sound, and the Yellow River are proposed as critical habitat.

6. Effects Determination

Sea Turtles

Density Estimates of Sea Turtles

Adults

Abundance and density data from the aerial survey portion of the GulfCet study best reflect the abundance and density of sea turtles within the area of interest. The survey area is known as the Minerals Management Service Eastern Planning Area and may be divided into continental shelf and slope regions.

In order to provide improved species conservation and protection, the species density estimate data were adjusted to reflect a more realistic situation and consider (1) temporal and spatial variations, (2) surface and submerged variations, and (3) overall density estimate confidence.

<u>Temporal and Spatial Variations:</u> The GulfCet II aerial surveys have identified different density estimates of sea turtles between winter and summer seasons, as well as between the shelf and slope geographic locations. Accordingly, the greatest species density estimate available for any given season or location was utilized for conservative impact assessments.

<u>Surface and Submerged Variations:</u> The GulfCet II surveys focus on enumerating animals detected at the ocean surface and therefore do not account for submerged animals. As such, the surveys do not provide a relative density estimate for the entire potential population of a given species. To provide a more conservative impact analysis, density estimates may be adjusted to account for submerged individuals. The species considered in this assessment are at the surface approximately 10 percent of the time (Moore and Clarke, 1998). Impacts are considered both by taking submergence into account and by considering surface time.

<u>Density Estimate Confidence:</u> The density estimates of sea turtles resulting from GulfCet II aerial surveys were determined with an associated standard deviation and resulting coefficient of variation. Each of these analyses provides a measure of confidence about the resultant density estimate. An upper confidence value of 2.576 standard deviations (approximately a 99 percent confidence level) was utilized to further adjust the density estimate for each species.

Table C-5 summarizes adjusted density estimates for sea turtles.

Table C-5. Sea Turtle Densities Based on GulfCet II Surveys

Species	Individuals/ 100 km^2	Individuals/mi^2	Adjusted Density (per mi^2) Surfaced Individuals	Adjusted Density (per mi^2) Total Population
Loggerhead	4.253	0.1102	0.1753	1.1667
Leatherback	0.327	0.0085	0.0211	0.0973
Kemp's ridley	0.097	0.0025	0.0100	0.0326
Unidentified	0.340	0.0088	0.0191	0.0984

km^2 = square kilometer(s) mi^2 = square mile(s)

Although no green sea turtles were identified by GulfCet II surveys, this species is known to occur, at least periodically, offshore of Eglin Air Force Base. Green turtles nest every other year on beaches along Santa Rosa Island, including Eglin property and adjoining areas. It is assumed that the turtles labeled as "unidentified" during the GulfCet II surveys include green turtles.

Juveniles/Hatchlings

In addition to adult turtles, hatchlings are present at certain times of the year. Loggerhead turtles nest most years on Santa Rosa Island, and green turtles nest every other year. Leatherback turtles nest on the island infrequently. Nesting generally occurs between May and August, and the incubation period is approximately 60 days. Eglin AFB has maintained turtle hatchling data since 1998. The number of hatchlings that emerged from the nests (as opposed to the total number of eggs) is shown in Table C-6.

Table C-6. Emergent Turtle Hatchlings on Santa Rosa Island

Species	1998	1999	2000	2001	2002
Loggerhead	77	966	2,831	200	379
Green	147	0	1,401	0	361
Leatherback	0	0	58	0	0

Almost all of the hatchlings emerged during the months of August and September. Averaging the number of emergent hatchlings per year and dividing by the number of days in the months of August and September results in the maximum number of hatchlings in the water per day during these two months (Table C-7). A density estimate for hatchlings in the water can be made by using the length of shoreline surveyed (17 miles) and a distance offshore with the conservative assumption that the hatchlings remained generally within that area. If the offshore distance is chosen to be 10 miles (to be consistent with previous analyses), the total area is 170 square miles. Assuming that all hatchlings move into the area of study and are uniformly distributed, the resulting density is shown in Table C-7. A large number of emergent hatchlings probably would not reach the water, or would perish soon after entering the water because of predation and other factors, but this analysis assumes a 100 percent survival rate.

Table C-7. Number and Density of Emergent Hatchlings Per Day During August and September

Species	# of Emergent Hatchlings	Density (per mi^2)
Loggerhead	15	0.088
Green	10	0.059
Leatherback	1	0.006

mi^2 = square mile(s)

Under the Proposed Action, effects to federally protected sea turtle species could potentially occur as a result of direct physical contact with surface vessels transitioning between offshore ships and the shoreline. The vessels include LCACs, AAVs, LCUs, and Zodiacs. Although LCACs do not directly touch the water surface, a flight over a turtle would be expected to be at least some form of physical harassment, though not necessarily mortality.

The action area consists of the transit area between Navy ships and Santa Rosa Island, which encompasses a rectangle 7 miles wide (i.e., the width between A-11 and A-15) out to a distance of about 10 miles offshore, plus the ship offshore operations of the Amphibious Ready Group or ARG, which consists of three amphibious ships and two to three cruisers/destroyers within an area known as the Inner Transport Area. The ships would primarily remain in a fixed position for durations of 3 to 4 days and if moving would do so at speeds of 5 to 10 knots. The Inner Transport Area encompasses an area about 5 x 20 miles or roughly 100 square miles. Due to the low number of ships and infrequency of movement within the Inner Transport Area, this area has been eliminated from analysis. Therefore, the total area of operations considered for impacts analysis is 70 square miles.

<u>Methodology for Effects Estimation</u>

The impact calculations for this section utilize sea turtle density estimates that have been derived from aerial surveys during the GulfCet II surveys. Ships and aircraft were used to collect sea turtle sighting data from 1996 to 1998.

During the 10-day period of ARG/MEU exercises, there are expected to be 130 crossings of LCACs between the Navy ships and shore (65 round trips), 78 crossings by AAVs, and 42 crossings by LCUs. LCACs are the largest vessels and their beam measurement (width) is used for conservative impact analyses. An LCAC is 47 feet in beam width, which is 0.0089 miles. The distance from Navy ship to shore is approximately 10 miles, so the total surface area potentially impacted per trip is 0.089 square miles. Multiplying this number by the total number of crossings results in a total water surface area of 22.25 square miles. The estimated density of surface and submerged sea turtles within the vessel transit areas is presented in Table C-8.

Table C-8. Number of Offshore Sea Turtles Within Vessel Transit Areas

Species	Number of Sea Turtles at the Surface	Number of Surface and Submerged Sea Turtles	Number of Hatchlings
Loggerhead	3.9	26.0	2.0
Leatherback	0.5	2.2	0.1
Kemp's ridley	0.2	0.7	0
Unidentified	0.4	2.2	N/A
Green	*	*	1.3
TOTAL	**5**	**31**	**3.4**

* Turtles listed as unidentified by GulfCet II are assumed to include green sea turtles. N/A = not applicable.

Effect Estimates

The above table indicates that the expected maximum number of sea turtles within the vessel transit area is less than 35 based on conservative estimates. Realistically, any effects would be limited to turtles at the surface, including hatchlings; thus, some number less than nine (surface turtles plus hatchlings) turtles would occupy the surface of the entire transit area at any given time over the 10-day duration of the exercise. Some percentage of these nine individuals may be affected through direct contact with a boat or amphibious vessel, but the likelihood is considered remote. Adult turtles would likely avoid collision, because the LCUs move very slowly and the LCACs produce loud noise that might be detected some distance away. Thus, the greatest potential risk would be related to direct contact with hatchlings during nesting season.

Activity occurring during nesting season MAY AFFECT BUT IS NOT LIKELY TO ADVERSELY AFFECT less than nine sea turtles.

Activity occurring outside of nesting season is NOT LIKELY TO ADVERSELY AFFECT sea turtles.

Avoidance and Minimization Measures for ARG/MEU Training

- Sea turtles have been associated with drifting *Sargassum*. Avoiding large mats of *Sargassum* during the day may minimize potential impacts.
- Nest relocation, proposed as a minimization measure for ARG/MEU beach landings, would move nests outside of the operation area, potentially reducing the number of hatchlings in the transit area.

Gulf Sturgeon and Proposed Critical Habitat

<u>Yellow River:</u> Gulf sturgeon are found in the lower Yellow River and appear to congregate near the Highway 87 Bridge and up to a few miles north of the bridge (Craft et al., 2001). Presently, there are no designated critical habitat areas for the Gulf sturgeon (USFWS, 1998), but the area of the Yellow River from Boiling Creek to Highway 87 appears to be an important summer

habitat for the sturgeon. Activities along the shore of this area that could cause potential impacts would be small boat landings (Zodiac boats only) from an R&S insertion or a small boat raid. Heavy sediment loads and low water volume from drought conditions were identified as factors potentially affecting sturgeon migration in the Yellow River. Erosion and siltation can cause eggs to be covered with sediment and prevent offspring from reaching the water column. No potential spawning sites occur within the 10 river miles of the Yellow River (Craft et al., 2001). Zodiac boats are not considered to have impacts to sturgeon habitats because of the shallow draft. Erosion and turbidity from boat landings would be minimal and would not affect known spawning sites. The landings would not result in any significant increase in shoreline small boat landings over what currently occurs as part of normal Eglin operations (approximately 1,500 per year at a number of landing sites throughout the reservation). Erosion and turbidity from small boat landings are not widespread or significant enough to affect the Gulf sturgeon through habitat alteration.

<u>Wynnhaven Beach</u> – Gulf sturgeon are known to migrate through Santa Rosa Sound; however, there are no spawning sites, congregation sites, or relocation sites within the Sound. Also, sturgeon prefer depths of approximately 6.5 to 13 feet. Sandy, muddy substrate may be affected by AAVs moving between Santa Rosa Island and Wynnhaven Beach. The area affected would be above the mean low tide 4-foot bathymetry line (maximum depth of AAVs). Due to the area affected (4-foot depth to shore) existing outside of their primary habitat (6.5 to 13 feet), migratory movement only in the Sound, and small impact area, impacts to the Gulf sturgeon through habitat alteration are not anticipated.

<u>All other locations</u> – There are no potential impacts to Gulf sturgeon or Gulf sturgeon habitat from small boat landings at Santa Rosa Sound, Wynnhaven Beach, Hammock Point (D-84), White Point, or East Bay.

As a result, ARG/MEU activities are NOT LIKELY TO ADVERSELY AFFECT Gulf sturgeon individuals, populations, or critical habitat.

EFH

Potential impacts from amphibious landing operations consist of the destruction or degradation of EFH, including emergent vegetation, seagrasses, oyster reefs, and artificial reefs. Vessels would move through *Sargassum*, but this contact would not significantly affect or reduce this habitat. Impacts could be caused by contact between the vessels and the sea floor. Contact could impact habitat quality either directly by physical disruption or indirectly by siltation.

Activities that may potentially result in such impacts are those that involve the use of LCACs, LCUs, and AAVs. Zodiac boats are not considered to have impacts to EFH because these boats have a shallow draft and are powered by a water intake and propulsion system rather than a propeller. Of the vessels considered, the LCU has the deepest draft, which is 7 feet. Mission activities that involve the use of one or more of these vehicles include the Amphibious Landing Rehearsal, Mechanized Raid Wet, MEU Landing, and Withdrawal. These activities may occur

at East Bay, Santa Rosa Island, Wynnhaven Beach, Destin Pass, White Point, and Hammock Point (D-84). During activities that utilize AAVs and LCUs, EFH could potentially be impacted in areas with water depth less than 7 feet. The map of resources shown in Figures A-41 through A-47 in Appendix A of the ARG/MEU EA shows where these areas are located. The LCACs do not touch the water surface and would cause water turbulence only to a shallow depth. The water turbulence could cause a small degree of siltation, as could physical impacts resulting from AAV and LCU operation. However, because of the infrequent occurrence of such activities and tidal flushing, the impacts resulting from siltation are considered to be minimal. The primary potential impact that could result from LCAC landings is damage to emergent vegetation.

East Bay

Because of the very shallow water depths approaching the shoreline, AAVs and LCUs would not be utilized at East Bay. LCACs would be the only amphibious vehicles employed. No emergent vegetation, seagrasses, oyster reefs, or artificial reefs are present in the area. Therefore, the proposed activities conducted at East Bay are not likely to adversely impact EFH.

Santa Rosa Sound

LCACs, AAVs, and LCUs would cross Santa Rosa Sound to Wynnhaven Beach. However, no emergent vegetation, seagrasses, or oyster reefs are present either along the potential Gulf landing sites or along the transit corridor to Wynnhaven. One artificial reef, a submerged shipwreck, is present close to shore in shallow water on the Gulf side of Santa Rosa Island. Contact with this structure could affect its utility as fish habitat as well as cause damage to the surface craft. If this structure is avoided, the proposed activities conducted at Santa Rosa Island are not likely to adversely impact EFH.

Wynnhaven Beach

LCACs, AAVs, and LCUs would be employed during activities on Santa Rosa Island. However, no emergent vegetation, seagrasses, oyster reefs, or artificial reefs are present. Therefore, the proposed activities at Wynnhaven Beach are not likely to adversely impact EFH.

Hammock Point (D-84)

AAVs and LCUs would not be used at Hammock Point (D-84) because of the shallow water depths extending a considerable distance offshore. No seagrasses are present in the area. Shallow oyster reefs and a small amount of emergent vegetation are present. The oyster reefs would not be impacted because operations would be limited to the use of LCACs. Site inspections suggest that the amount of emergent vegetation is not significant, and LCACs would not pose any serious, long-term threats. An artificial reef is located off Hammock Point, but it is in water more than 12 feet deep. Therefore, the proposed activities at Hammock Point (D-84) are not likely to adversely impact EFH.

White Point

Water depths are shallow for a considerable distance off White Point as well, so AAVs and LCUs would not be used. No oyster reefs or artificial reefs are present. Seagrass is found in the area but would not be impacted because of the absence of AAV and LCU activity. A small amount of emergent vegetation is present, but site inspections suggest that the amount of emergent vegetation is not significant, and LCACs would not pose any serious, long-term threats. Therefore, the proposed activities at White Point are not likely to adversely impact EFH.

7. Conclusion

Overall, ARG/MEU amphibious transport activities within the Gulf of Mexico and the waters of Santa Rosa Sound, East Bay, Choctawhatchee Bay, and the Yellow River are not likely to adversely affect or would have no effect on the Gulf sturgeon or essential fish habitat.

ARG/MEU amphibious activities in the Gulf, if conducted during nesting season, are likely to adversely affect transient offshore sea turtles through harassment from noise and potential injury or mortality through direct physical contact with amphibious vessels. This is unlikely, however, as the vessels are either very slow or create substantial amounts of noise, which would likely cause adult sea turtles to avoid contact with the vessels. Mortality of sea turtle hatchlings may result from amphibious vessel contact, as the hatchlings may not be able to avoid the vessels in time. Impact analysis indicates that effects would be limited to turtles at the surface, with estimations based on sea turtle density calculations showing potential impacts to approximately nine turtles (adults plus hatchlings) per 10-day training period. ARG/MEU training activities would take place up to twice annually, with one 10-day period occurring sometime during nesting season.

The NMFS will be notified immediately if any of the actions considered in this biological assessment are modified or if additional information on listed species becomes available, as a reinitiation of consultation may be required. If impact to listed species occurs beyond what has been considered in this assessment, all operations would cease and the NMFS would be notified. Any modifications or conditions resulting from consultation with the Service would be implemented prior to commencement of activities. Eglin AFB and AAC/EMSN believe this fulfills all requirements of the ESA and the MSFCMA and no further action is necessary.

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NATIONAL MARINE FISHERIES SERVICE

INFORMAL CONSULTATION REGARDING
IMPACTS TO

FEDERALLY LISTED SPECIES
ESSENTIAL FISH HABITAT

RESULTING FROM
Amphibious Ready Group/Marine Expeditionary Unit Readiness Training
at Eglin Air Force Base, Florida

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APPENDIX D

FORMAL U.S. FISH AND WILDLIFE SERVICE

Endangered Species Act Section Seven Consultation

for

Amphibious Ready Group/Marine Expeditionary Unit Readiness Training at Eglin AFB, FL

Biological Assessment to Determine Impacts to Federally Listed Species Resulting from Amphibious Ready Group/Marine Expeditionary Unit Readiness Training at Eglin Air Force Base, Florida

1. Introduction

The following document is being submitted to fulfill requirements under Section 7 of the Endangered Species Act (ESA). Briefly, this report addresses potential impacts to all federally listed threatened and endangered (T&E) species associated with Amphibious Ready Group/Marine Expeditionary Unit (ARG/MEU) readiness training activities at Eglin Air Force Base (AFB), Florida, and Hurlburt Field, Florida. For purposes of this biological assessment (BA), Eglin AFB covers Hurlburt Field also. This BA, conducted by Eglin's Natural Resources Management Branch (EMSN), is meant to initiate the formal consultation process with the U.S. Fish and Wildlife Service (USFWS) pursuant to Section 7 of the ESA. The objectives of this BA are to:

- Document all federally listed T&E species and associated habitat that occur, or may potentially occur, on the Eglin AFB Military Complex and the near-shore waters of the Gulf of Mexico, to include the Eglin Mainland Reservation and Santa Rosa/Okaloosa Island, Florida.
- Identify the ARG/MEU training activities, as described in the Environmental Assessment (EA), that have the potential to impact, either beneficially or adversely, those documented species.
- Determine and quantify to the extent possible what effects these activities would likely have on federally listed species.

This BA is a tiered document, utilizing the ARG/MEU EA as a reference for pertinent information.

2. Proposed Action

As described in Chapters 1 and 2 of the ARG/MEU EA, the Proposed Action involves the development of a training capability for ARG/MEU training at Eglin AFB in order to maximize training opportunities for the U.S. Marine Corps prior to deployment. The Proposed Action is, therefore, to conduct ARG/MEU readiness training at Eglin AFB.

The training is anticipated to occur twice per year with each training event having a total duration of 10 days, or less if only a portion of the activities is conducted. It is possible that the training could only occur once during some years and possibly not at all in others. This BA will assess the impacts associated with training occurring at a maximum level of twice per year, with the understanding that it may occur less. A summary list of the 17 proposed training activities is provided below:

- Insertion of Forward Command Element
- Insertion of Reconnaissance and Surveillance (R&S) Teams
- MEU Aviation Operations
- Helicopter Raids
- Rapid Ground Refueling
- Small Boat Raids
- Amphibious Landing Rehearsal
- Mechanized Raid (Wet)
- Mechanized Raid (Dry)
- MEU Landing
- Major Highway Crossing
- Supporting Arms Coordinating Exercise (SACEX)
- Live Fire and/or Maneuver
- Non-combatant Evacuation Operation
- Direct Action
- Tactical Exercise Control Group/Opposing Force (TECG/OPFOR) Requirements
- Withdrawal

These proposed activities involve one or more of five basic elements that are the building blocks of training: amphibious landings, ground movement, aviation operations, munitions use, and pyrotechnics use.

Amphibious landings: This is the ship-to-shore movement of landing crafts (landing craft air cushion [LCAC] and landing craft utility [LCU]), amphibious assault vehicles, and small boats (Zodiacs). The landing crafts are used to transport all nonamphibious vehicles along with other equipment and troops.

Ground movement: This is the movement of tracked and wheeled vehicles and troops on foot from landing sites to objective areas, from objective area to objective area, and from objective areas back to amphibious shipping (during withdrawal).

Aviation operations: This is the delivery of troops and equipment from ship to shore via a variety of helicopters that would land at designated landing zones scattered throughout the Eglin reservation and might include a fixed-wing escort. Aviation operations also occur during live fire exercises and could include weapons delivery from F/A-18 and A/V-8A aircraft.

Munitions use: This is live fire from ground-based troops and vehicles as well as air delivery of larger munitions. This also includes the use of blank munitions during raids.

Pyrotechnics use: Raids on objective sites with opposing forces acting as resistance involves the use of pyrotechnics (smokes and flares). Additionally, the amphibious assault vehicles (AAVs) deploy smoke when traveling from ship to shore.

A complete description of each activity is given in Chapter 2 of the ARG/MEU EA, while Tables D-1 and D-2 provide a summary of the locations of each training activity and their relationships with the elements described previously.

For the purposes of this BA, analysis will first focus on identifying the elements associated with each training activity, then determining the potential impacts to listed species from these elements (e.g., amphibious landings to sea turtles), and finally, assessing the cumulative impacts from an activity as a whole and from an entire ARG/MEU readiness training operation.

3. Location and Setting Description

Location

Eglin AFB occupies 724 square miles of land area in the northwest Florida panhandle, east of Pensacola (shown in Figure 1-1 of the ARG/MEU EA). This represents a major portion of the Florida panhandle's land area. Over the Gulf of Mexico, Eglin AFB controls 124,642 square miles of airspace (Figure 1-3 of the ARG/MEU EA). Consequently, Eglin has a rich diversity of unique landscapes, habitats, and species that often fall under federal and state regulatory mandates. The land area of the Eglin Military Complex is comprised of test areas and interstitial areas (the areas between the test areas) as shown in Figure 1-2 of the ARG/MEU EA. The test areas make up about 50,000 of the 463,000 total acres of the Eglin land range.

The Eglin Military Complex includes Santa Rosa/Okaloosa Island (Figure 1-2 of the ARG/MEU EA). Santa Rosa Island (SRI), located in the southern section of Eglin AFB in Okaloosa County and Santa Rosa County, Florida, is a narrow barrier island approximately 50 miles long and less than 0.5 mile wide, separated from mainland northwest Florida by Santa Rosa Sound, a shallow lagoon varying in width from 400 to nearly 5,000 feet, and Choctawhatchee Bay. It is bordered on the south shore by the Gulf of Mexico and on the north shore by Santa Rosa Sound and Choctawhatchee Bay. Eglin controls 4,760 acres of SRI, a 4-mile strip eastward of Fort Walton Beach open for public recreation, and a restricted access 13-mile section extending to the west to Navarre Beach, Florida. There are 2.5 miles of Okaloosa County property between the two parcels of Eglin property. Each of the three sections of island has unique characteristics (developed versus undeveloped land), and 15 Eglin AFB test sites are located on SRI (U.S. Air Force, 1997).

Table D-1. Training Activity Locations

Location	Training Activity																
	FCE	R&S	HR	RGR	SBR	ALR	MRW	MRD	MEU	RX	SACEX	LF/M	DA	NEO	WD	SO	TO
Geographic Locations																	
Gulf of Mexico	✔	✔			✔	✔	✔		✔				✔	✔	✔	✔	
Yellow River		✔			✔												
East Bay River		✔			✔												
Choct. Bay	✔	✔			✔		✔		✔					✔	✔		
Santa Rosa Sound	✔	✔			✔	✔	✔		✔					✔	✔		
SRI	✔	✔	✔		✔	✔	✔		✔				✔	✔	✔		
Wynnhaven Corridor	✔	✔				✔	✔		✔	✔					✔		
Hammock Point (TA D-84)	✔	✔			✔	✔	✔		✔	✔				✔	✔		
White Point	✔	✔			✔	✔	✔		✔	✔				✔	✔		
Alaqua Point										✔							
East Bay Point		✔			✔	✔			✔	✔				✔	✔		
Hurlburt Field						✔			✔	✔					✔		
Auxiliary Fields																	
1		✔	✔	✔			✔	✔	✔			✔			✔		✔
2		✔	✔	✔			✔	✔	✔			✔			✔		✔
3		✔	✔	✔			✔	✔	✔			✔			✔		✔
4		✔		✔			✔	✔	✔			✔			✔		✔
5		✔		✔			✔	✔	✔			✔			✔		✔
6		✔	✔	✔			✔	✔	✔			✔			✔		✔
7	✔	✔	✔	✔			✔	✔	✔			✔		✔	✔		✔
8		✔	✔	✔			✔	✔	✔			✔			✔		✔
10	✔	✔	✔	✔			✔	✔	✔			✔		✔	✔		✔
Landing Zone East		✔		✔			✔	✔	✔			✔			✔		✔
Test Areas																	
A-11		✔															
A-11A		✔					✔	✔	✔						✔		✔
A-13B		✔					✔	✔	✔						✔		✔
A-15		✔					✔	✔	✔				✔		✔		
A-22	✔													✔			✔
A-77		✔					✔	✔	✔			✔			✔		✔
A-78		✔					✔	✔	✔			✔			✔		✔
A-79		✔					✔	✔	✔			✔			✔		✔
B-5		✔					✔	✔	✔			✔			✔		✔
B-12		✔					✔	✔	✔			✔			✔		✔
B-70		✔					✔	✔	✔			✔			✔		✔
B-71		✔					✔	✔	✔			✔			✔		✔
B-82		✔					✔	✔	✔			✔			✔		✔
B-75		✔					✔	✔	✔			✔			✔		✔
C-1																	✔
C-52		✔					✔	✔	✔		✔	✔			✔		✔
C-53		✔					✔	✔	✔			✔			✔		✔
C-62		✔					✔	✔	✔			✔			✔		✔
C-72		✔					✔	✔	✔			✔			✔		✔
Other																	✔
Several LZ/DZs	✔	✔	✔	✔					✔		✔			✔	✔		✔
Military Airspace	✔		✔						✔		✔	✔		✔	✔		✔
Eglin Range Roads	✔	✔					✔	✔	✔	✔		✔		✔	✔		✔
US 98, SR 20										✔							
Interstitial Areas		✔	✔		✔		✔	✔	✔			✔		✔	✔		✔

FCE = Insertion of Forward Command Element
HR = Helicopter Raid
R&S = Insertion of Reconnaissance & Insertion Team
RGR = Rapid Ground Refueling
SBR = Small Boat Raid
ALR = Amphibious Landing Rehearsal
MRW = Mechanized Raid Wet
MRD = Mechanized Raid Dry
RX = Major Highway Crossing
MEU = ARG/MEU Landing
LF/M = Live Fire and/or Maneuver
DA = Direct Action
NEO = Non-Combatant Evacuation Operation
WD = Withdrawal
TA = Test Area
SO = Ship Operations
TO = TECG/OPFOR

✔ = Location of MEU event-related activities (including transportation corridors between objective sites))

Table D-2. Training Activity-Related Elements

Mission Activity	Element															
	Amphibious Landing				***Ground Movement***			***Aviation Operations***		***Munitions Use***				***Pyrotechnics***		
	LCAC	LCU	AAV	ZODIAC	Troops	Tracked Vehicle	Wheeled Vehicle	Helos	Planes	Blanks	Small Arms	Large Guns	Bombs/Mortars / Rockets/Lasers	Flares	Smokes	Simulators
Insertion of Forward Command Element	✔	✔					✔	✔								
Insertion of R&S Teams	✔			✔	✔			✔		✔				✔	✔	✔
Helicopter Raid					✔			✔	✔	✔				✔	✔	✔
Rapid Ground Refueling								✔	✔							
Small Boat Raid	✔			✔	✔			✔	✔	✔				✔	✔	✔
Amphibious Landing Rehearsal	✔	✔	✔		✔	✔	✔	✔	✔						✔	
Mechanized Raid Wet	✔	✔	✔		✔	✔	✔	✔	✔	✔				✔	✔	✔
Mechanized Raid Dry					✔	✔	✔	✔	✔	✔				✔	✔	✔
MEU Landing	✔	✔	✔		✔	✔	✔	✔	✔	✔					✔	✔
Major Highway Crossing			✔		✔	✔	✔									
SACEX					✔	✔	✔	✔	✔			✔	✔			
Live Fire and/or Maneuver					✔	✔	✔	✔	✔		✔	✔	✔	✔	✔	
Direct Action				✔	✔			✔			✔			✔	✔	✔
Non-Combatant Evacuation Operation		✔			✔		✔	✔		✔				✔	✔	✔
Withdrawal	✔	✔	✔		✔	✔	✔	✔	✔							
TECG/ OPFOR							✔			✔						✔
Ship Operations	✔	✔	✔	✔				✔	✔							

Setting Description

The Eglin Military Complex covers an extremely large area. Many different soil complexes, water resources, and ecosystems are found throughout the Reservation. As a result, relatively large areas (thousands of acres), which are ecologically similar, are combined to facilitate management direction. Areas are combined based on floral, faunal, and geophysical similarities. These five areas include the Sandhills, Wetlands/Riparian, Flatwoods, Barrier Island, and Grassland/Shrubland ecological associations. The Coastal Uplands ecological association dominates SRI. Several sensitive plant and animal species are supported by habitats on the Eglin Mainland Reservation and SRI. A complete, detailed description of soil types, climate, water resources, and wildlife can be found in Chapter 3 of the ARG/MEU EA. Descriptions of ecological associations (to include vegetation, historical land management practices, and their present status) can be found in Appendix F of the ARG/MEU EA.

The surf zone area, considered as part of Santa Rosa/Okaloosa Island in this BA, is a shallow area covering the continental shelf seaward of the island to a depth of approximately 30 feet. The distance from the island shoreline, which corresponds to this depth, varies from approximately 0.5 miles at the western side of the Air Force property to 1.5 miles at the eastern side (Figure 1-2 of the ARG/MEU EA) extending out into the inner continental shelf. A sandbar is located offshore of TA A-15 in approximately 10 feet of water. Relict sand ridges form approximately NW at depths of about 60 feet and deeper. The DeSoto Canyon, at the edge of the shelf, is approximately 100 kilometers south of SRI (U.S. Air Force, 1997).

4. Species Descriptions

Table D-3 lists the federally listed threatened and endangered species associated with the Eglin Military Complex (the Eglin Mainland Reservation, Santa Rosa/Okaloosa Island, and the surf zone) that will be addressed in this BA.

Critical habitat has been designated for the piping plover on SRI. The red-cockaded woodpecker (RCW) population of Eglin AFB has been identified as a recovery population. The following species descriptions are summaries of detailed descriptions given in Appendix E of the ARG/MEU EA, which are adapted from the USFWS threatened and endangered species home page species accounts and information acquired from the Florida Fish and Wildlife Conservation Commission (FWC) website.

Table D-3. Federally Listed T&E Species Associated with the Eglin Military Complex

Species		Federal Status	Location
Scientific Name	**Common Name**		
Fish			
Acipenser oxyrinchus desotoi	Gulf sturgeon	T	SZ, EMR
Etheostoma okaloosae	Okaloosa darter	E	EMR
Amphibians and Reptiles (Terrestrial)			
Ambystoma cingulatum	Flatwoods salamander	T	EMR
Drymarchon corais couperi	Eastern indigo snake	T	EMR
Amphibians and Reptiles (Marine)			
Caretta caretta	Atlantic loggerhead turtle	T	SRI/OI, SZ
Chelonia mydas	Atlantic green turtle	E	
Dermochelys coriacea	Leatherback turtle	E	
Birds			
Charadrius melodus	Piping plover	T/CH	SRI/OI
Haliaeetus leucocephalus	Bald eagle	T	EMR
Picoides borealis	Red-cockaded Woodpecker	E	EMR
Plants			
Cladonia perforata	Florida perforate lichen	E	SRI/OI

E – Endangered; T – Threatened; CH – Critical Habitat; EMR – Eglin Mainland Reservation;
SRI/OI – Santa Rosa/Okaloosa Island; SZ – Surf Zone

Gulf Sturgeon (*Acipenser oxyrinchus desotoi*)

The Gulf sturgeon migrates from salt water into large coastal rivers to spawn and spend the warm months (Wordsworth Dictionary of Science and Technology, 1995). It lives predominately in the northeastern Gulf of Mexico, where it ranges from the Mississippi Delta east to the Suwannee River in Florida. However, it can be found in the bays and estuaries throughout this range (U.S. Coast Guard, 1996). Spawning takes place in fresh water, such as the Yellow River, which borders Eglin AFB along the northwest, during April through June (Paruka, 1996). Little is known about the offshore distance the Gulf sturgeon travels, but analyses of stomach contents suggest that feeding occurs as far as 20 miles offshore (Page and Burr, 1991; U.S. Coast Guard, 1996). The proposed rule for Gulf sturgeon critical habitat was published in the Federal Register in June 2002, but a final determination has not been made. In the area of interest, all of Choctawhatchee Bay, East Bay, Santa Rosa Sound, and the Yellow River are proposed as critical habitat.

Okaloosa darter (*Etheostoma okaloosae*)

The Okaloosa darter is found in six small Choctawhatchee Bay Basin tributaries located in the Sandhills ecological association of the Eglin Mainland Reservation (shown in Figures A-20 and A-38, Appendix A of the ARG/MEU EA). The darter's diet consists primarily of immature aquatic insect larvae. Spawning occurs from March to October, with the greatest amount of activity taking place during April. The spawning occurs in beds of clean, current-swept macrophytes (large aquatic plants). Okaloosa darter habitat is sensitive to a variety of disturbances. Erosion can increase siltation and imperil the darter's habitat. Its range has also been reduced by habitat modification and encroachment by the brown darter. In order to protect

the Okaloosa darter, the quantity and quality of water in the streams must be protected (USFWS, 1998).

Flatwoods Salamander (*Ambystoma cingulatum*)

The flatwoods salamander is a small mole salamander about five inches in length when fully mature (Federal Register, 1 April 1999). Habitat for the flatwoods salamander consists mainly of open, mesic (moderate moisture) woodland of longleaf/slash pine flatwoods maintained by frequent fires. Adult flatwoods salamanders breed during the rainy season from October to December (Palis, 1997). Their breeding sites are isolated flatwoods depressions that dry completely on a cyclic basis and are generally shallow and relatively small. Known locations of flatwoods salamander breeding sites are shown in Figures A-41 - A-47, Appendix A of the ARG/MEU EA. Since the salamander may disperse over long distances to and from breeding sites to upland sites where they live as adults, desiccation (drying out) can be a limiting factor in their movements. As a result, it is important that areas connecting their wetland and terrestrial habitats are protected in order to provide cover and appropriate moisture regimes during their migration.

Eastern Indigo Snake (*Drymarchon corais couperi)*

The eastern indigo snake is the largest nonvenomous snake in North America and can grow up to 125 inches in length. The snake is a meat-eater (carnivorous) and will eat any animal up to about the size of a squirrel. Xeric Sandhill winter dens are used from December to April. From May to July they shift from winter dens to summer territories, and from August through November they are frequently located in shady creek bottoms. These seasonal changes in habitat encourage the maintenance of travel corridors that link these different habitat types. Although they use stump holes, armadillo and gopher holes, and other wildlife ground cavities, the eastern indigo snake is most strongly associated with gopher tortoise burrows. They use abandoned burrows in winter and spring for egg laying, shedding, and protection from dehydration and temperature extremes. Movement along travel corridors between seasonal habitats also exposes the snake to danger from increased contact with humans. From 1978 to 1999, Jackson Guard reported the sighting of 18 indigo snakes (U.S. Air Force, 2000) throughout the Eglin Mainland Reservation, based on FNAI element occurrences and incidental sightings. Many of these snakes were seen crossing roads or after being killed by vehicles.

Sea Turtles

Of the five species of marine turtles found in the Gulf of Mexico, three species are known to nest on SRI beaches. These species are the Atlantic green turtle, Atlantic loggerhead turtle, and the leatherback turtle. However, the majority of nests on SRI are from loggerhead sea turtles. The U.S. Fish and Wildlife Service oversees sea turtle protection and conservation of habitat on land, while the NOAA Fisheries branch of the National Marine Fisheries Service (NMFS) oversees protection in marine waters. The officially recognized sea turtle nesting and hatching season in northwest Florida occurs from May 1 through October 31, with most hatching between mid-August and mid-October.

Aerial surveys of Atlantic loggerhead turtles have indicated that they are most common in waters less than 50 meters deep. Aerial surveys indicate that there are fewer numbers of turtles visible

in shallow waters during the winter months than in the summer months. During the warmer months, the turtles spend more time at the water surface. During 1987, a survey of the maximum densities of sea turtles east of the Mississippi River to Perdido Bay, Alabama, resulted in an estimate of 0.3 sea turtles per 100 square kilometers. Estimates of sea turtle densities east of the Mississippi River from June 1988 to June 1990 ranged from 0.92 (winter) to 4.83 (spring) turtles per 100 square kilometers (U. S. Air Force, 1999).

Atlantic Loggerhead Sea Turtle (Caretta caretta)

Loggerhead sea turtles nest within the continental United States from Louisiana to Virginia (National Marine Fisheries Service and U.S. Fish and Wildlife Service, 1991). Nesting females approach SRI in the spring and summer to dig their nests between the high tide mark and the dune line, and sometimes between dunes. A more detailed explanation of loggerhead nesting and hatching activity on SRI is provided in Section 5.

Atlantic Green Sea Turtle (Chelonia mydas)

The Atlantic green sea turtle (*Chelonia mydas*) has a breeding population in Florida and along the Pacific Coast of Mexico, which is listed as endangered; all other populations are listed as threatened. Nesting activity has been documented along the Florida Gulf coasts (Meylan et al., 1995) as well. Green turtle nesting has been documented in all counties in northwest Florida but not on all beaches. The officially recognized nesting and hatching season for the green sea turtle extends from May 1 through October 31 in Florida's panhandle. Nesting in the panhandle, however, has been consistently documented as an every other year event since 1990, with incubation periods ranging from 60 to 90 days. Eglin AFB SRI property supports the highest number of green sea turtle nests in northwest Florida. A more detailed explanation of green sea turtle nesting and hatching activity on SRI is provided in Section 5.

Leatherback Sea Turtle (Dermochelys coriacea)

This species commonly nests along the shorelines of the Atlantic, Pacific, and Indian Oceans. Only infrequent nesting activity has been documented for the leatherback in northwest Florida (LeBuff, 1976; FWC FMRI, unpubl. data; Longieliere et al., 1997). The officially recognized nesting and hatching season for the leatherback extends from March 1 through October 31, with nest incubation ranging from 60 to 75 days. (FWC FMRI unpublished data; Longieliere et al., 1997; FWC FMRI, 1998). Until the spring of 2000, the only confirmed leatherback nestings in northwest Florida were in Franklin and Gulf counties. In May and June 2000, leatherback nesting activity was documented for the first time in Okaloosa County on Eglin's portion of SRI (Miller, personal communication, 2000). A more detailed explanation of leatherback nesting and hatching activity on SRI is provided in Section 5.

Piping Plover (Charadrius melodus)

This birds' primary winter range is along the Atlantic and Gulf coasts from North Carolina to Mexico and into the Bahamas and West Indies (USFWS, 1988, 1989, and 1989a as cited in USFWS, 1996). Piping plovers are commonly documented during winter in the Florida panhandle, with highest numbers of birds occurring in Franklin, Gulf, and Bay counties. Even though Florida has not been considered a primary wintering area for piping plover, diminishing

habitat along other Gulf coast areas may be affording the piping plover new wintering grounds in Florida. These wintering grounds are still considered less suitable, thus forcing the piping plover to utilize isolated patches. As a result, critical habitat has been designated for piping plovers along the Gulf coast of Florida, a portion of which covers SRI (Figure A-37).

Piping Plover Critical Habitat

Wintering critical habitat for the piping plover was designated on July 10, 2001 (66 *Federal Register* 36038). *Critical habitat* is a term that refers to specific geographic areas that contain the essential habitat features necessary for the conservation of threatened and/or endangered species. These essential habitat features are found in coastal areas that support intertidal beaches and flats (between annual low tide and annual high tide) and associated dune systems and flats above annual high tide. At the time of designation, the critical habitat areas do not necessarily have to be occupied by piping plovers. Critical habitat areas may require special protection or management considerations for current populations as well as potential population increases necessary to achieve species recovery.

The USFWS has identified several activities that may potentially have adverse impacts on piping plover critical habitat. Such activities may include dredging and dredge spoil placement; seismic exploration; construction and installation of facilities, pipelines, and roads associated with oil and gas development, oil spills, and oil spill cleanup; construction of dwellings, roads, marinas, and other structures; staging of equipment and materials; beach nourishment, stabilizations, and cleaning; all-terrain vehicular activity; storm water and wastewater discharge; sale, exchange, or lease of federal land that contains suitable habitat that is likely to result in the habitat being degraded; marsh restoration; and military maneuvers.

Bald Eagle (*Haliaeetus leucocephalus*)

The bald eagle has two incidences of occurrence on the Eglin Military Complex: one nest at Cape San Blas and one nest on the Eglin Mainland Reservation (Figure A-47, Appendix A of the ARG/MEU EA). Bald eagles nest when they reach four years of age. They are territorial and exhibit a strong affinity for a nest site once a nest has been established. It is common for a breeding pair to rebuild damaged or lost nests in the same tree or in an adjacent tree. The nesting period in the southeast United States extends from 1 October to 15 May, with most nests being completed by the end of November. Individual pairs return to the same territory year after year, and territories are often inherited by subsequent generations.

Eagles typically lay between one and three eggs with an incubation period of 34 to 36 days. In northwest Florida, most successful nests are laid by mid-February. A nesting pair typically produces one to three fledglings, but usually only one fledgling will survive. The quality and amount of forage resources heavily influence fledgling survival. The fledging period has been documented to last from 70 to 98 days. Eagles forage on fish and carrion.

Red-cockaded Woodpecker (*Picoides borealis)*

The RCW inhabits the interstitial areas of the Eglin reservation (see Figure A-38, Appendix A of the ARG/MEU EA). On Eglin, the RCW typically inhabits mature, open stands of longleaf pine. The RCW does not migrate and maintains year-round territories near nesting and roosting trees

(Hooper et al., 1980). Studies by DeLotelle et al. (1987) in central Florida found that RCWs foraged primarily in longleaf pine and pond cypress stands with dense ground cover of broomsedge bluestem (*Andropogon virginicus*). An RCW cluster typically encompasses about 10 acres with most cavity trees most likely within a 1,500-foot diameter circle.

The woodpeckers primarily feed on spiders, ants, cockroaches, centipedes, and insect eggs and larvae that are excavated from trees. Dead, dying, and lightning-damaged trees that are infested with insects are a preferred feeding source. The birds also feed on the fruits of black cherry (*Prunus serotina*), southern bayberry (*Myrica cerifera*), and black tupelo (*Nyssa sylvatica*) (Baker, 1974).

High quality RCW forage habitat consists of open pine stands with tree dbh (diameter at breast height) averaging nine inches and larger. While 100 acres of mature pine is sufficient for some groups, clans commonly forage over several hundred acres where habitat conditions are not ideal (Jackson et al., 1979). The greatest threat to the RCW populations is loss and fragmentation of their habitat. As a result of active management, RCW populations on Eglin have continued to increase with the number of active clusters growing from an estimated 217 in 1994 to 308 in 2001 (Moranz and Hardesty, 1998; Petrick, 2001).

Florida Perforate Lichen (*Cladonia perforata)*

This pale, yellowish-gray lichen forms large dense clusters, the branches of which arise from spore-producing structures and not from the vegetative body of the fungus as is the case with other branched lichens. This species was listed as endangered in the *Federal Register,* April 27, 1993. There are a total of 27 confirmed sites in Florida where this lichen can be found, two of which are on SRI (Figure A-39). This fragile species is vulnerable to trampling from foot traffic and habitat destruction during land development and high-intensity storm events.

5. Effects of Proposed Action Implementation

The activities described under the Proposed Action (Chapter 2 of the ARG/MEU EA) have the potential to impact federally listed species associated with the Eglin Military Complex. Effects analysis in this BA focuses on the elements associated with each training activity (identified in Table D-2) and their potential impacts to species. Once element impacts are identified, these impacts are correlated to actual training activities (e.g., impacts of amphibious landings to sea turtles are correlated to a MEU landing, a mechanized raid [wet], etc.). The narrative of potential impacts associated with ARG/MEU elements and activities is divided amongst each species, after which a summary matrix is provided that correlates the effects determination of the element analysis to the actual training activity. Section 6 of this document provides a cumulative effects determination for the entire ARG/MEU readiness training exercise.

Gulf Sturgeon (*Acipenser oxyrinchus desotoi)*

Amphibious Landings

Small Boat Landings

Yellow River - Gulf sturgeon are found in the lower Yellow River and appear to congregate near the Highway 87 Bridge and up to a few miles north of the bridge (Craft et al., 2001). Presently, there are no designated critical habitat areas for the Gulf sturgeon (USFWS, 1998a), but the area of the Yellow River from Boiling Creek to Highway 87 appears to be an important summer habitat for the sturgeon. Activities along the shore of this area that could cause potential impacts would be small boat landings (Zodiac boats only) from an R&S insertion or a small boat raid. Heavy sediment loads and low water volume from drought conditions were identified as factors potentially affecting sturgeon migration in the Yellow River. Erosion and siltation can cause eggs to be covered with sediment and prevent offspring from reaching the water column. No potential spawning sites occur within the 10 river miles of the Yellow River (Craft et al., 2001). Zodiac boats are not considered to have impacts to sturgeon habitats because of the shallow draft. Erosion and turbidity from boat landings would be minimal and would not affect known spawning sites. The landings would not result in any significant increase in shoreline small boat landings over what currently occurs as part of normal Eglin operations (approximately 1,500 per year at a number of landing sites throughout the reservation). Erosion and turbidity from small boat landings are not widespread or significant enough to affect the Gulf sturgeon through habitat alteration.

Alaqua Point – Wintering Gulf sturgeon have been found to congregate near Alaqua Point along the northern sections of Choctawhatchee Bay approximately 1,000 feet from shore (Paruka, personal communication, 2003). Gulf sturgeon do not enter waters less than 2 feet deep and prefer depths of approximately 6.5 to 13 feet (Paruka, personal communication, 2003). Zodiac boats are not considered to impact sturgeon habitats because of the shallow draft. Also, no potential spawning sites occur in Choctawhatchee Bay; therefore, erosion and turbidity from boat landings would be minimal and would not affect known spawning sites. The area affected would be above the 2-foot bathymetry line (maximum depth for small boat landings) to the shoreline. The small amounts of erosion and turbidity from small boat landings at Alaqua Point are not widespread or significant enough to affect the Gulf sturgeon through habitat alteration.

All other locations – There are no potential impacts to Gulf sturgeon habitat from small boat landings at Santa Rosa Sound, Wynnhaven Beach, Hammock Point (D-84), White Point, or East Bay.

As a result, activities associated with small boat landings for ARG/MEU training activities are anticipated to have NO EFFECT on Gulf sturgeon individuals or populations.

AAVs

Wynnhaven Beach – Gulf sturgeon are known to migrate through Santa Rosa Sound; however, there are no spawning sites, congregation sites, or relocation sites within the Sound. Also, sturgeon prefer depths of approximately 6.5 to 13 feet. Sandy, muddy substrate may be affected

by AAVs moving between SRI and Wynnhaven Beach. The area affected would be above the mean low tide 4-foot bathymetry line (maximum depth of AAVs) to the shoreline. Figures A-41 - A-47, Appendix A of the ARG/MEU EA, show the shaded area from the 6-foot bathymetry line to shore. Due to the area affected (4-foot depth to shore) existing outside of their primary habitat (6.5 to 13 feet), migratory movement only in the Sound, and small impact area, impacts to the Gulf sturgeon through habitat alteration are not anticipated.

As a result, activities associated with AAV landings from ARG/MEU activities are anticipated to have NO EFFECT on Gulf sturgeon individuals or populations.

Amphibious Landing Avoidance and Minimization Procedures

Only established boat landings along the Yellow River would be utilized. Bottom scarring from AAV use would be minimized, and seagrass beds would be avoided to the extent practicable.

Summary Table

Table D-4. Summary Effects Determination for Gulf Sturgeon

Training Activity	**Element**
	Amphibious Landing
Insertion of Forward Command Element	NE
Insertion of R&S Teams	
Small Boat Raid	
Amphibious Landing Rehearsal	
Mechanized Raid Wet	
MEU Landing	
Direct Action	
Non-Combatant Evacuation Operation	
Withdrawal	

NE = No Effect

Okaloosa darter (*Etheostoma okaloosae*)

Ground Movement

Excess sedimentation is the major threat to Okaloosa darter habitat; therefore, minimization of erosion in Okaloosa darter watersheds is extremely important. Okaloosa darter watersheds are contained within portions of these Test Areas/Auxiliary Fields where MEU training operations are proposed: TA C-52, TA C-72, TA C-53, TA C-5, and Auxiliary Fields 1, 2, 3, 5, and 8 (Figures A-20 and A-38, Appendix A of the ARG/MEU EA). Although specific movement corridors are unknown at this time, troops and equipment would also potentially be moving in interstitial areas that contain Okaloosa darter streams.

Troops

Foot traffic, both on and off established roads, has the potential to cause erosion problems. However, troop movements through Okaloosa darter streams would be minimal, and would not be conducted in such a manner as to cause excessive erosion (e.g., many troops crossing at the same area creating “crossing ruts,” crossing at steeply sloped areas, etc).

As a result, activities associated with troop ground movement from MEU activities are anticipated to NOT LIKELY ADVERSELY AFFECT Okaloosa darter individuals or populations provided that avoidance and minimization procedures are followed.

Wheeled and Tracked Vehicles

Wheeled and tracked vehicles have the potential to increase erosion rates if driven in inappropriate areas. However, wheeled and tracked vehicles would be restricted to established roadways, trails, and bridges throughout the interstitial area and on test areas when near Okaloosa darter streams.

As a result, activities associated with wheeled and tracked vehicle use from MEU activities are anticipated to have NO EFFECT on Okaloosa darter individuals or populations provided that avoidance and minimization procedures are followed.

Ground Movement Avoidance and Minimization Procedures

Avoidance and minimization procedures that would be employed to minimize impacts to the Okaloosa darter from ground movement associated with MEU training include:

- Vehicles and troops use established roads, trails, and bridges near Okaloosa darter streams.
- Vehicles and troops avoid activities such as driving, digging, or other soil disturbing activities on steep slopes near Okaloosa darter streams and in newly restored areas adjacent to Okaloosa darter streams.
- Minimizing ground disturbance from troop crossings near Okaloosa darter streams.
- Conducting operations in accordance with guidelines in the Range Road Maintenance Guidebook and the Test Area Maintenance Programmatic Environmental Assessment.
- Pyrotechnics use to follow Eglin's Wildfire Specific Action Guide Restrictions.

Summary Table

Table D-5. Summary Effects Determination for Okaloosa Darter

Training Activity	**Element**
	Ground Movement
Insertion of Forward Command Element	NE
Insertion of R&S Teams	NLAA
Small Boat Raid	NE
Amphibious Landing Rehearsal	
Mechanized Raid Dry	NLAA
MEU Landing	
SACEX	
Live Fire/Maneuver	
Non-Combatant Evacuation Operation	NE
Withdrawal	NLAA

NE = No Effect
NLAA = Not Likely to Adversely Affect

Flatwoods Salamander (*Ambystoma cingulatum*)

Ground Movement

During MEU operations, vehicles, troops, and equipment would be transported through areas with potential and confirmed flatwoods salamander habitat. Because many of the areas identified as potential habitat were based on very preliminary analysis of Geographic Information System (GIS) data and have not been verified, these areas are not currently considered to have a high likelihood of actually supporting flatwoods salamander populations but are mentioned here as areas to avoid when possible. Potential flatwoods salamander habitat can be found inland from the landing areas at East Bay Point, A-22, White Point, Alaqua Point, and Hammock Point (D-84) (Figures A-41 – A-47, Appendix A of the ARG/MEU EA). Potential flatwoods salamander habitat is also scattered in numerous interstitial areas of Eglin AFB, including concentrations along the East Bay River, Yellow River, northeast of Hurlburt Field, and along Choctawhatchee Bay.

Most of the confirmed flatwoods salamander habitat on Eglin Air Force Base and Hurlburt Field is concentrated south of the East Bay River. Movements from Wynnhaven Point and Hurlburt Field will traverse confirmed flatwoods salamander habitat. From the landing at Wynnhaven Point, resources would be moved inland to objective areas north on Range Road (RR) 259, then west on RR 668, then north on RR 253. This route crosses through confirmed flatwoods salamander habitat (Figure A-40, Appendix A of the ARG/MEU EA). From the landing at Hurlburt Field, resources would be moved inland via the main entrance to Hurlburt, then west on RR 666 and north on RR 253, both of which cross through confirmed flatwoods salamander habitat (Figure A-40). There are also confirmed flatwoods salamander breeding wetlands located to the northwest of Wynnhaven Point along the East Bay River and northeast of Hurlburt Field.

Troops

Ground troops coming ashore at Wynnhaven Point, Hurlburt Field, East Bay Point, Yellow River, Hammock Point (D-84), Alaqua Point, and White Point would be moving inland through either confirmed or potential flatwoods salamander habitat. The only area where troops would be moving through confirmed flatwoods salamander habitat is south of the East Bay River, where they will remain on established roads. During the larger operations (MEU Landing and Withdrawal, Small Boat Raid, Mechanized Raid Wet), a maximum of 200 foot troops could move through any one of these areas at any given time. Heavy foot traffic by troops would have the potential to impact flatwoods salamander habitat by degrading water quality and altering hydrology. During R&S operations (potentially occurring at all beach landing sites except Hurlburt Field), four- to five-man teams would come ashore at established boat landings and move inland for reconnaissance. This may involve movement through interstitial areas that contain potential flatwoods salamander habitat. However, if troops remain on established roads near identified flatwoods salamander habitat constraint areas (inner buffers shown in Figure A-40), foot traffic associated with MEU training activities is not anticipated to impact the salamander.

As a result, activities associated with ground troop movement from MEU activities are anticipated to NOT LIKELY ADVERSELY AFFECT flatwoods salamander individuals or populations provided that avoidance and minimization procedures are followed.

Wheeled Vehicles

The main areas of concern for wheeled vehicle use near flatwoods salamander habitat are Wynnhaven Point, Hurlburt Field, East Bay Point, Hammock Point (D-84), Alaqua Point, and White Point. Wheeled vehicles would be offloaded at these beach landing sites, then transit inland to objective sites. During transit to objective sites, vehicles would move through areas with both confirmed and potential flatwoods salamander habitat. Wheeled vehicles have the potential to impact flatwoods salamander ponds by altering hydrology and degrading water quality. However, vehicles would be restricted to established roads near salamander habitat and would not infringe upon buffer areas.

As a result, activities associated with wheeled vehicle use from MEU activities are anticipated to have NO EFFECT on flatwoods salamander individuals or populations provided that avoidance and minimization procedures are followed.

Tracked Vehicles

The only area where tracked vehicles (tanks, AAVs) would be moving in proximity to flatwoods salamander habitat is on Range Roads (RR) 259, 668, and 253 between Wynnhaven Point and the East Bay River during the MEU Landing and Withdrawal. Currently the portion of RR 259 between Highway 98 and RR 668 (1.5 miles) is paved with asphalt, which cannot support tracked vehicle traffic. Along this section of RR 259, there are three confirmed flatwoods salamander breeding wetlands. On the west side of the road, there are ponds within 62 feet and 108 feet of the road, and on the east side a pond is located 433 feet from the road (Figure A-40, Appendix A of the ARG/MEU EA). Primary buffer habitat (538 feet) overlaps with the existing road for all three ponds.

Site designs have not been finalized at this time, but plans are for a tank trail to be built adjacent to the section of asphalt that passes through the flatwoods salamander habitat on the east side, with the existing asphalt left in place for use by wheeled vehicles. Widening along certain sections of RR 259 would be required because a minimum width of 15 feet of non-asphalted surface is required for the tracked vehicles. Figure A-40, Appendix A of the ARG/MEU EA, shows the proposed road improvements for this area in relation to confirmed flatwoods salamander breeding wetlands and the buffers around those ponds.

EMSN and SAIC staff conducted a field evaluation of the quality and quantity of primary flatwoods salamander buffer habitat that would be impacted by the construction of a tank trail on the east side of RR 259. Most of the 15-foot swath east of RR 259 (width required for tank trail) is already cleared road shoulder, but approximately 7,920 square feet of poor-to-moderate quality buffer habitat and 10,560 square feet of good quality buffer habitat would need to be cleared for the tank trail. The good quality buffer habitat is located just north of the second section of RR 259 that will be concreted and is across the road from the large southernmost salamander breeding pond on the west side of RR 259. No salamander ponds would be directly impacted by

the tank trail. The major short and long term impacts from a tank trail would include potential erosion/sedimentation from construction and maintenance of the trail, mounding of dirt such that salamanders could not cross the trail, and hydrological changes to breeding wetlands. There would be potential short-term impacts from construction associated with erosion/sedimentation, but BMPs outlined in the Range Road Maintenance PEA would minimize those impacts.

Road improvements associated with tracked vehicle use on RR 259 from MEU activities are LIKELY TO ADVERSELY AFFECT flatwoods salamander habitat. Avoidance and minimization procedures would help to minimize the potential for impacts.

Ground Movement Avoidance and Minimization Procedures

Avoidance and minimization procedures that would be employed to minimize impacts to the flatwoods salamander from ground movement associated with MEU training include:

- Restrict activities in isolated wetlands and within good condition primary buffers.
- When it is impossible to avoid flatwoods salamander habitat, confine impacts to poor buffer habitat versus high quality buffer habitat (as determined by AAC/EMSN survey).
- Avoid mounding of materials on sides of the road.
- Put RR 259 tank trail on east side of the road near flatwoods salamander habitat to minimize impacts.
- For road improvement/construction activities along RR 259, RR 668, and RR 253, employ BMPs outlined in the Range Road Maintenance Guidebook.
- South of the East Bay River, restrict large troop movements to established road surfaces.
- For pyrotechnics use, follow Eglin's Wildfire Specific Action Guide Restrictions.

Summary Table

Table D-6. Summary Effects Determination for Flatwoods Salamander

<table>
<tr><th rowspan="3">Training Activity</th><th colspan="3">Element</th></tr>
<tr><th colspan="3">Ground Movement</th></tr>
<tr><th>Troops</th><th>Wheeled Vehicles</th><th>Tracked Vehicles</th></tr>
<tr><td>Insertion of Forward Command Element</td><td rowspan="2">NLAA</td><td rowspan="7">NE</td><td rowspan="5">N/A</td></tr>
<tr><td>Insertion of R&S Teams</td></tr>
<tr><td>Helicopter Raid</td><td>NE</td></tr>
<tr><td>Small Boat Raid</td><td>NLAA</td></tr>
<tr><td>Amphibious Landing Rehearsal</td><td>NE</td></tr>
<tr><td>Mechanized Raid Wet</td><td rowspan="3">NLAA</td><td rowspan="2">NE</td></tr>
<tr><td>Mechanized Raid Dry</td></tr>
<tr><td>MEU Landing</td><td>NE</td><td>LAA (Tank Trail)</td></tr>
<tr><td>SACEX</td><td rowspan="4">NE</td><td rowspan="4"></td><td>N/A</td></tr>
<tr><td>Live Fire and/or Maneuver</td><td>NE</td></tr>
<tr><td>Direct Action</td><td rowspan="2">N/A</td></tr>
<tr><td>Non-Combatant Evacuation Operation</td></tr>
<tr><td>Withdrawal</td><td>NLAA</td><td>NE</td><td>LAA (Tank Trail)</td></tr>
</table>

NE = No Effect NLAA = Not Likely to Adversely Affect LAA = Likely to Adversely Affect N/A = Not Applicable

Eastern Indigo Snake *(Drymarchon corais couperi)*

The only real potential impact to the eastern indigo snake is from direct physical impacts associated with ground movement on the Eglin Mainland Reservation. Incidental contact with troops on foot and wheeled and tracked vehicles could result in trampling or crushing of individuals. However, this occurrence is unlikely, as the snake would most likely move away from the area if it sensed a general disturbance in its vicinity.

With adherence to avoidance and minimization procedures as outline below, MEU activities are NOT LIKELY TO ADVERSELY AFFECT the eastern indigo snake.

Ground Movement Avoidance and Minimization Procedures

- MEU personnel, as part of an educational overview of all federally listed species on Eglin, would be provided a description of the eastern indigo snake, its habits, and protection under Federal Law.
- MEU personnel would receive instructions not to injure, harm, or kill this species.
- Should an indigo snake be sighted, MEU personnel would be directed to cease any activities and allow the eastern indigo snake sufficient time to move away from the site on its own before resuming such activities.
- To the extent possible, gopher tortoise burrows would be avoided.

Summary Table

Table D-7. Summary Effects Determination for Eastern Indigo Snake

Training Activity	**Element**		
	Ground Movement		
	Troops	*Wheeled Vehicles*	*Tracked Vehicles*
Insertion of Forward Command Element	NLAA		
Insertion of R&S Teams			
Helicopter Raid			
Small Boat Raid			
Amphibious Landing Rehearsal			
Mechanized Raid Wet			
Mechanized Raid Dry			
MEU Landing			
SACEX			
Live Fire and/or Maneuver			
Direct Action			
Non-Combatant Evacuation Operation			
Withdrawal			

NLAA = Not Likely to Adversely Affect

Sea Turtles (*Chelonia mydas, Caretta caretta,* and *Dermochelys coriacea*)

As a part of the Florida Fish and Wildlife Conservation Commission’s statewide Index Nesting Beach Survey (INBS), the restricted portion of the SRI beachfront has been divided into

half-mile survey zones, and nesting data are recorded according to the zone in which they occur. To facilitate the calculation of impact on the nesting sea turtle population, data were complied and calculated for zones 1-9 and 14-18, extending from just west of test site A-15 to just east of test site A-11A, as this covers the extent of the Proposed Action area on SRI. Figure A-39, Appendix A of the ARG/MEU EA, shows these INBS zones in relation to the proposed troop and vehicle movement corridors. This map also provides a color-coded indication of nesting intensity for each zone by species. The pink color below each nesting zone indicates the average number of loggerhead nests and the yellow or green color indicates the average number of green turtle nests. The key for these color codes is provided on the lower right hand side of the top map panel. This color-coded map feature was created to provide an overall picture of relative nesting intensity across the Proposed Action area. As a complement to this map, the average annual nest occurrence within each zone is displayed in Figures D-1 and D-2 below. These averages were calculated over 13 years for the Atlantic loggerhead and over 7 years for Atlantic green turtles due to the fact that green turtles nest only every other year on SRI. For example, an examination of Figure A-39 shows that the proposed crossover corridor west of site A-13B would affect INBS zone 04. By finding zone 04 in Figures D-1 and D-2, it can be determined that during a loggerhead nesting year, this zone receives an average of 0.54 nests and during a green turtle nesting year, this zone receives an average of 0.71 green turtle nests in addition to average loggerhead nests.

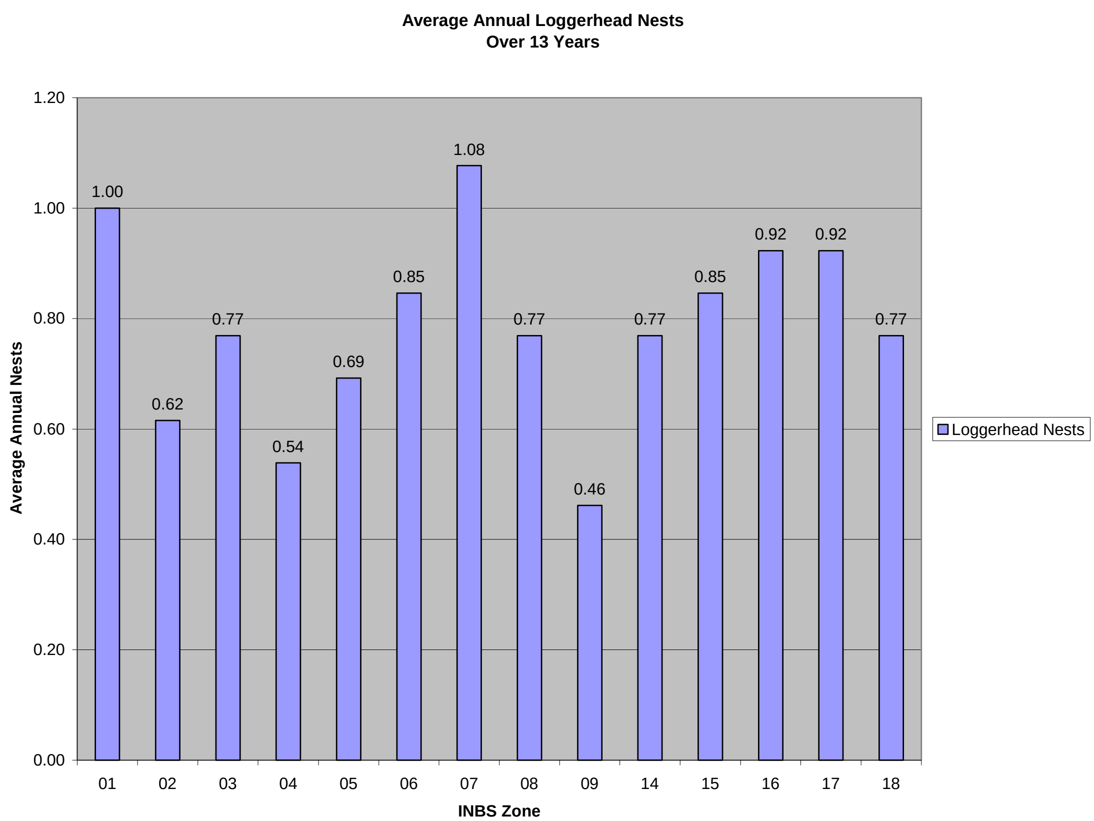

Figure D-1. Average Loggerhead Nesting Data By INBS Zone (1989–2002)

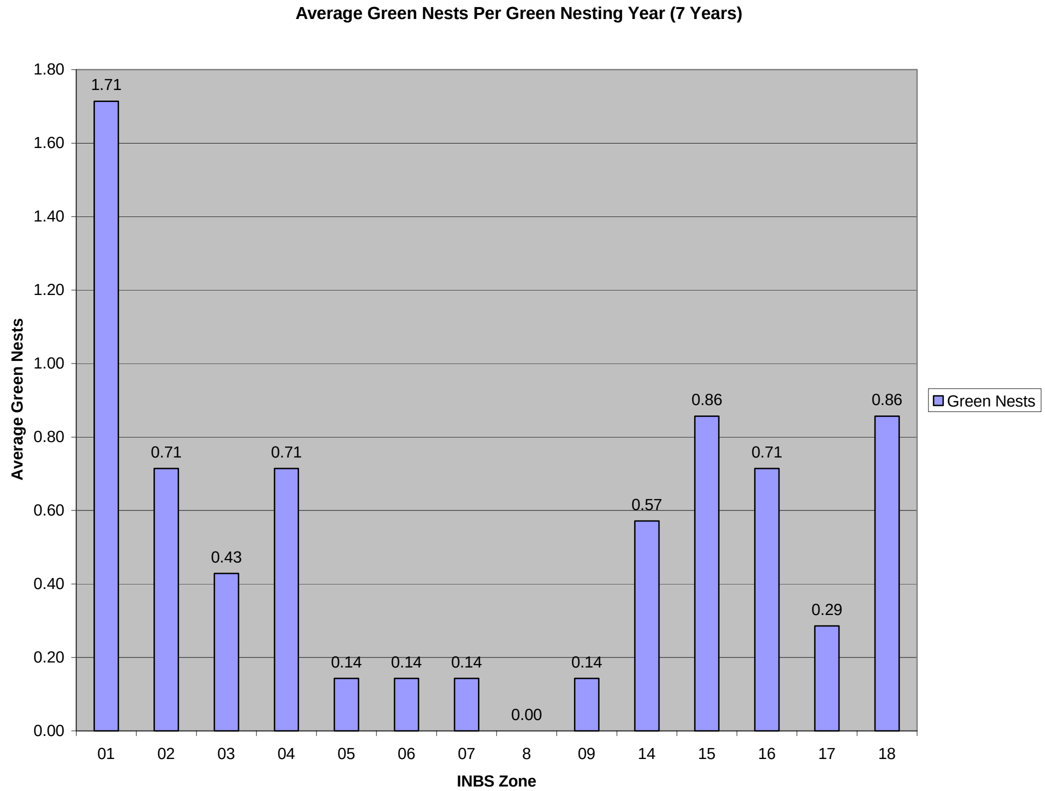

Figure D-2. Average Green Turtle Nesting Data by INBS Zone (Biannually 1990–2002)

Due to the seasonality of sea turtle nesting and hatching behavior, the effects of each training element must be analyzed according to the time period during which training takes place. To simplify the analysis of impact to Eglin's nesting population, the sea turtle reproduction cycle can be divided into four time periods. During the first time period, only nesting occurs within the exercise area. During the second time period, hatchlings emerge from previously laid nests while adult sea turtles continue to come ashore to lay new nests. During the third time period, adults have ceased to come ashore for nesting while hatchlings continue emerging from existing nests. During the fourth time period, neither nesting nor hatching behavior is expected to occur in the exercise area. Because nesting and hatching activity usually occurs under the cover of darkness, nighttime MEU operations are more likely to impact reproduction.

An analysis of INBS emergence data for SRI revealed that out of 174 loggerhead nests, 149 (or 85 percent) hatched after 60 to 80 days of incubation. The shortest recorded incubation length for a loggerhead nest is 52 days and the longest is 89 days. Out of 54 green turtle nests, 45 (or 83 percent) hatched after 60 to 80 days of incubation. The shortest recorded incubation length for a green turtle nest is 51 days and the longest is 82 days. The two recorded incubation lengths for leatherback nests were 85 and 94 days (U.S. Air Force, 2003). Based on this information, four time periods were calculated for each species. The earliest and latest possible dates for all species were selected to produce the combined species time periods (Table D-8).

Table D-8. Sea Turtle Nesting Periods by Species

Species	Nesting Only	Nesting and Hatching	Hatching Only	Off-Season
Caretta caretta	5/19 - 7/9	7/10 – 8/22	8/23 – 11/19	11/20 – 5/18
Chelonia mydas	5/20 – 7/9	7/10 – 8/22	8/23 – 11/12	11/13 – 5/19
Dermochelys coriacea	5/12 – 6/19	N/A	8/5– 9/21	9/22– 5/11
Combined Species	**5/12 – 7/9**	**7/10 – 8/22**	**8/23 – 11/19**	**11/20– 5/11**

Based on the data presented in Table D-8, ARG/MEU operations taking place on SRI between 11/20 and 5/11 effectively have a 0 percent probability of directly impacting sea turtle nesting and hatching activities. However, if the Proposed Action occurs within the sea turtle nesting and/or hatching time periods, in order to better quantify possible impacts, it is necessary to determine how nesting and hatching activity is distributed throughout these time periods. Figure D-3 shows the average number of nests that have occurred on Eglin SRI by month. Again, the total number of green turtle nests was averaged over 7 years, while that for loggerheads and leatherbacks was averaged over 13 years (Figure D-3). This information indicates that the peak nesting period for loggerhead sea turtles occurs in June, earlier than the peak green turtle nesting period, which occurs in July.

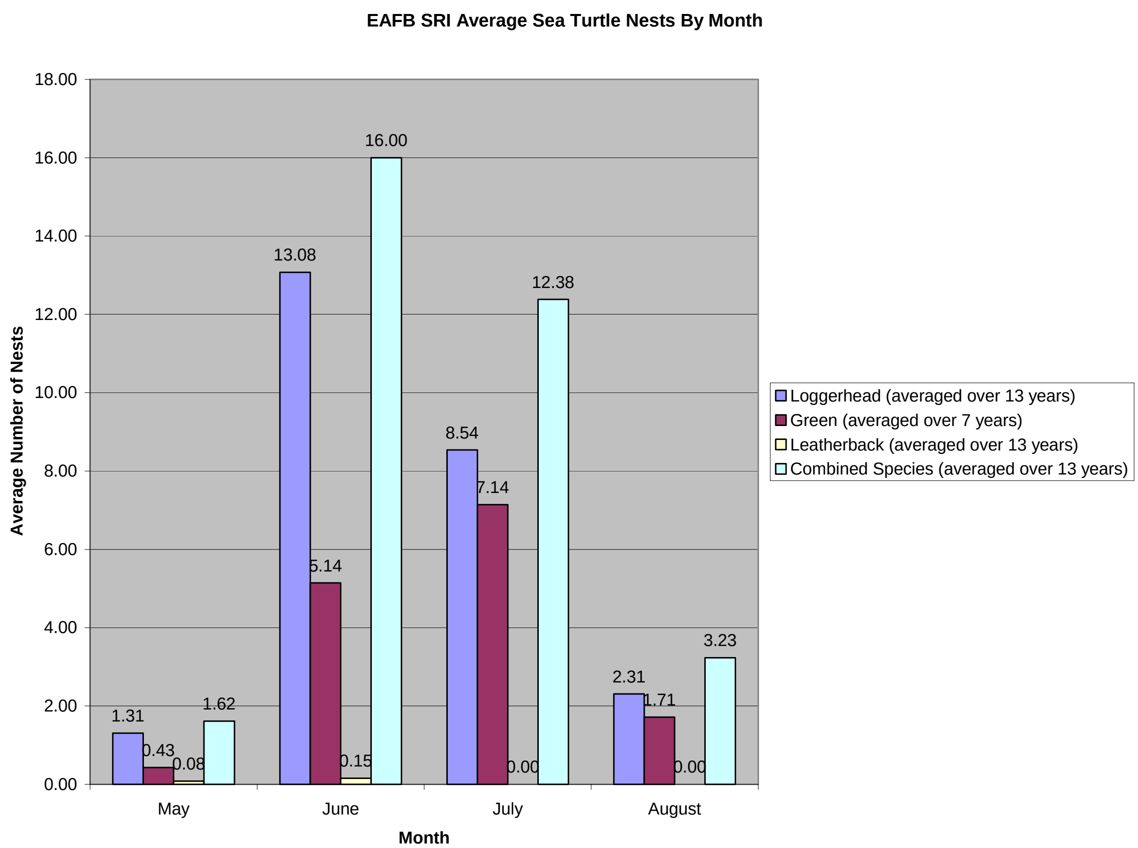

Figure D-3. Eglin AFB SRI Average Sea Turtle Nest Occurrences by Month (1989-2002)

Because historical hatchling emergence data for Eglin AFB, SRI, are incomplete, an expected average emergence by month was calculated for each species based on the available emergence

data. For example hatchling emergence dates have been recorded for 174 of 328 total loggerhead nests. Of the 174 recorded hatching dates, only 4 (2.3 percent) occurred in July. If this percentage is applied to the total number of loggerhead nests recorded, we would expect 7.54 loggerhead nests to have occurred in July over the 13-year data collection period, yielding an average of 0.58 loggerhead nests annually during the month of July. This information is summarized in Table D-9. This table provides an estimated number of hatching events expected in each given month. Emergence dates are not available for a randomly selected sample of nests for each species, and therefore these averages may be slightly skewed. However, because emergence dates were available for 233 out of the 432 total nests, the calculated averages should suffice for purposes of this analysis.

Table D-9. Eglin AFB SRI Calculated Average Sea Turtle Hatching Occurrences by Month

	Species	**Loggerhead**	**Green**	**Leatherback**	**Combined**
	Total Nest	328	101	3	432
	No. Nests w/ recorded hatching dates	174	57	2	233
July	Calculated Average	0.58	1.01	0.00	1.14
August	Calculated Average	13.05	4.05	0.00	17.10
September	Calculated Average	9.14	6.83	0.03	16.00
October	Calculated Average	2.32	2.53	0.00	4.85
November	Calculated Average	0.15	0.00	0.00	0.15

The effects on sea turtle reproduction and appropriate avoidance and minimization measures for MEU operations on SRI have been divided into five categories: deterrence, direct impact, obstruction, disorientation, and survey interference. These five categories, as described below, are the basis for impact analysis for the five MEU training elements: munitions use, pyrotechnics use, aviation operations, amphibious landings, and ground movement.

Deterrence: Nesting females may be deterred from entering landing corridors during nighttime operations because of general noise disturbances and commotion. Actively nesting females may be deterred from completing the egg laying process for these reasons. Bright lighting around nesting beaches also adversely affects the nesting process of adult green turtles, as they will avoid those areas subject to bright light.

Direct impact: MEU activities along the beachfront may cause direct physical impact to adults, hatchlings, and nests in the landing area either by direct strike of an animal or through causality of nest collapse.

Obstruction: Watercraft staged on the beachfront may impede the nesting activities of females coming ashore and may obstruct the movement of hatchlings to the water.

Disorientation/Misorientation: The principal component of the sea-finding behavior of emergent hatchlings is their visual response to light. For this reason, bright lighting along beachfronts often results in the disorientation (loss of bearing) or misorientation (incorrect bearing) of the hatchlings. As a result, the exposure of the hatchlings to predation and desiccation is substantially increased.

<u>Survey Interference:</u> Survey interference involves the obscurance or obliteration of evidence of sea turtle nests. This would adversely affect the ability to identify, index, and monitor nests, as well as impede the ability to carry out avoidance and minimization procedures such as nest relocation actions that would help to minimize potential impacts from military mission activities.

Munitions Use

Munitions use on SRI would be confined to small arms and blank firing during insertion of R&S teams, direct actions, small boat raids, and the mechanized raid wet. It is possible that 4- to 5-man R&S teams may be inserted by helicopter a maximum of five times during the ARG/MEU training cycle. Blank munitions may be used briefly during the initial part of the insertion. Nighttime small boat raids lasting 6 to 8 hours would occur a maximum of four times during the 10-day training cycle. These four raids may occur at any of the sites shown in Figure A-7, but it is highly unlikely that all four events would occur on SRI. However, if small boat raids do occur on SRI, they would take place at sites A-11A and/or A-12. Site A-12 is situated on the north side of the island approximately 0.36 miles from the south shoreline. Raiding forces would approach this objective from the sound without disturbance to sea turtle nesting areas. Because of this distance, noise associated with blank munitions fire at A-12 is not expected to affect sea turtle nesting activity on the beachfront.

A nighttime wet mechanized raid may occur on SRI a maximum of two times during the 10-day training cycle. As shown on Figure A-9, these raids would only occur at site A-15 and/or site A-11A. A direct action may occur at most once during the ARG/MEU exercise at site A-15. During this exercise, only a single shot would be fired outside of the building and all other munitions would be expended within the building. Because small arms munitions firing would occur within the building, munitions-related noise from a direct action would not deter nesting females from coming ashore near the action area. A summary of the SRI night activities that may involve firing of blank munitions is provided in Table D-10.

Based on these descriptions, small arms blank munitions may be fired on SRI during a maximum of 11 ARG/MEU activities on SRI. Deterrence effects to nesting sea turtles from noise occurring in the absence of visual disturbance is not well understood, and the amount and intensity of noise necessary to deter nesting females remains undocumented (Lutz et al., 2002). If however noise levels sufficient to deter nesting emergences do occur, this noise would have a localized affect on the beachfront. The peak rate of nesting emergences per night per unit area of beach front can be estimated to help determine how many nesting emergences, if any, may be deterred during the course of these activities.

The peak nesting season can be estimated using the information in Figure D-3. The information displayed in the figure indicates that loggerhead nesting peaks in June. Dividing the average number of nests occurring in June by 30 days yields a peak nesting emergence rate of 0.436 nests per night. By the same method, during a green turtle nesting year, the peak nesting rate is calculated to be 0.032 nests per night (number of green turtle nests in July divided by 31 days). To determine the peak nesting rate within a half-mile section of beachfront, the peak nesting emergence rate for each species is divided by the number of half-mile segments comprising Eglin AFB sea turtle nesting beach (i.e., 34). Therefore the peak rate of loggerhead turtle nesting emergences is 0.013 nests per night per half-mile, and the peak rate of green turtle nesting

emergences is 0.0009 nests per night per half-mile. Because only three leatherback nests have been documented on Eglin AFB, SRI, over a 13-year period, the leatherback nesting emergence rate is effectively nil.

In summary, these low rates of nesting emergences during peak nesting season greatly reduce the probability that nesting sea turtles would be deterred by ARG/MEU-related blank munitions firing. This probability would be further reduced if exercises were conducted outside of the peak nesting seasons for each species.

Therefore, noise associated with localized small arms blank firing at night during nesting/hatching season on SRI is NOT LIKELY TO ADVERSELY AFFECT sea turtles. Activities during the day are expected to have NO EFFECT.

Pyrotechnics Use

Both smokes and signal flares may be used at night on SRI during the insertion of R&S teams, mechanized raid wet, small boat raid, and the direct action. Smokes do not produce appreciable amounts of noise and are not expected to impact sea turtle nesting or hatching behaviors. Infrequent use of signal flares during nighttime operations would not produce a sustained illumination beyond a few seconds and are therefore not considered to be a disorientation threat for emerging hatchlings.

Simulators may also be used at night on SRI during these four training activities. Noise produced by simulators is comparable to the noise produced by firing small arms blank munitions, and therefore the rate of nesting deterrence due to simulator use would also be comparable (see discussion of munitions above). According to Table D-10, simulators would be used in conjunction with small arms blanks during a maximum of 11 operations. Simulators may also be used during a direct action, bringing the total number of activities involving simulators to 12. Because simulators would most often be used in conjunction with small arms blank firing, the spatial extent and duration of noise deterrence would not be effectively increased by simulator use. As discussed above, the low rates of nesting emergences during peak nesting season greatly reduce the probability that nesting sea turtles would be deterred by ARG/MEU related blank munitions and/or simulator use.

In summary, the proposed use of smokes and signal flares on SRI should have NO EFFECT on sea turtles. Due to the low probability of nesting deterrence, the proposed use of simulators on SRI is NOT LIKELY TO ADVERSELY AFFECT sea turtles.

Table D-10. Night Operations Involving Blank Munitions, Simulators and/or Low-Altitude Helicopter Operations on SRI

Training Activity	Maximum Number of Night Events	Proposed Locations on SRI	Blank Munitions	Simulators	Low-Altitude Helicopter Operations
R&S	5	A-15, A-13B (HLZ Taylor and CJ)	✔	✔	✔(5 landings)
SBR	4	A-11A. A-12	✔	✔	
MRW	2	A-15, A-11A	✔	✔	
DA	1	A-15 (HLZ Taylor)		✔	✔ (5 landings)

HLZ = helicopter landing zone

Aviation Operations

Helicopter and fixed-wing aircraft may provide air support and surveillance for all training activities conducted on SRI/OI; however, due to noise concerns for populated areas just across Santa Rosa sound, all flights over the island would be no lower than an altitude of approximately 500 feet. Aviation operations at this altitude are not expected to produce noise beyond what currently occurs above SRI. No lights would be directed at the island from aircraft above. Due to the height of island over flights, no impact to sea turtles is expected from aviation operations above 500 feet in altitude over SRI/OI.

Helicopter landings on SRI/OI are unlikely due to the fact that rudder wash can cause dangerous whiteout conditions in sandy environments. However, during nighttime R&S insertions, troops may repel onto one of two designated helicopter landing zones (HLZs) on the island from Huey or CH-46 helicopters a maximum of five times over the course of the 10-day ARG/MEU exercise (Figure A-2). Five helicopter troop insertions may also occur at HLZ Taylor (site A-15) during a direct action, bringing the total number of low-altitude helicopter operations to a maximum of 10 events during a maximum of two nights (Table D-10). During these troop insertions, helicopters may hover at an altitude of less than 100 feet for about five minutes while troops deploy. Due to the requirement for stealth during troop insertions, helicopters would not use lighting on SRI. All helicopter landings and low altitude troop insertions would occur beyond the primary dune line with no direct effect to the beachfront.

Low-altitude helicopter operations would be relatively short in duration and would occur in conjunction with blank munitions and simulator use described above; therefore, helicopter use would not effectively increase the spatial extent or duration of possible nesting deterrence. As with the other noise producing training elements discussed above, the probability that a nesting female would attempt to enter the beach within a half-mile of these activities is very low, even during peak nesting periods.

In summary, the possible cumulative nesting deterrence resulting from ARG/MEU-related use of blank munitions, simulators, and low-altitude troop insertions is very low. Table D-10 shows that a maximum of 12 night-training activities would involve these elements. If noise from each of these 12 activities was audible and sufficiently intense along an entire half-mile section of beach front, for an entire night during peak nesting season, the number of nesting deterrences would be estimated by adding the peak nesting rate for loggerhead and green turtles and multiplying that sum by 12. As determined in the discussion of munitions above, the peak rate for loggerheads is 0.013 nests per night per half-mile; the peak rate for green turtles is 0.0009 nests per night per half-mile, for a total of 0.0139 nests per night per half-mile. For all 12 training activities, the total number of deterred nesting events could be estimated at 0.17 nests. During a year when green sea turtles are not nesting on SRI, the number of possible nests deterred during the peak nesting period would be 0.16. If any or all of these activities occur outside of the peak nesting periods, the rate of deterrence would be further reduced.

Because insertions of this manner would be brief and localized behind the primary dune line and no lighting would be involved, and because the probability of deterring nesting females is low, the proposed aviation operations over SRI are NOT LIKELY TO ADVERSELY AFFECT sea turtles.

Amphibious Landings

Figure A-39, Appendix A of the ARG/MEU EA, shows the amphibious landing corridors proposed for SRI. LCACs, AAVs, LCUs, and Zodiacs would be employed during amphibious landing/withdrawal activities on SRI. **By definition, the amphibious landing portion of an exercise involves bringing the craft just above the waterline. The impacts of crafts moving above the waterline are addressed in the *Ground Movement* section below**. The possible impact of each craft is addressed individually and a summary of the effects of amphibious landing and detailed recommendations for avoidance and minimization measures follow.

Landing Craft Air Cushion (LCAC)

LCACs may land at SRI a total of 66 times during the 10-day ARG/MEU cycle. The number of LCACs landing during any single mission activity may vary from only a single craft during the insertion of forward command elements to as many as 30 craft during the 15-hour MEU landing. LCACs would land on the beach only within designated crossover and access corridors at test sites A-13B and A-11A (Figure A-39).

The LCAC is a "hovercraft," riding on a cushion of air approximately four feet above the surface. Therefore, no portion of the LCAC hull structure is expected to penetrate the water or land surface. LCAC landings (bringing LCACs to just above the water line) are not expected to produce ruts in the sand. Expected sand displacement from LCACs operating above the water line is addressed in the *Ground Movement* section below. During night operations, the noise generated by the craft's centrifugal fans and gas turbine engines as well as the general disturbance caused by a craft of this size (88 feet long and 47 feet wide) is likely to deter nesting females from coming ashore in or near the landing corridor. Noise and vibrations produced by the craft may also disturb emerging hatchlings in or near the landing corridors. Sand blown from beneath the air cushion during both day and night operations may obscure evidence of sea turtle nesting, interfering with surveyors' ability to accurately locate, monitor, and protect nest sites. Loggerhead nests have been documented on SRI below MHW (Miller, 2002).

Use of LCACs for amphibious landing activities at night between 5/12 and 11/19 is LIKELY TO ADVERSELY AFFECT sea turtles. However, adherence to proper avoidance and minimization measures, as described following this narrative, can greatly reduce the potential for adverse impacts to sea turtle populations. Activities during the day are expected to have NO EFFECT.

Amphibious Assault Vehicle (AAV)

A total of 52 AAVs would land on SRI beachfront during the 10-day ARG/MEU training cycle. A maximum of 13 AAVs may come ashore at SRI during any single mission activity. AAVs may land at any point between test sites A-15 and A-11A, with concentrated AAV activity at designated crossing/access corridors.

The general disturbance produced while multiple crafts approach and land on the beachfront would be sufficient to deter nesting females from entering landing corridors while nighttime operations are under way. Additionally, amphibious landings may disturb actively nesting

females. Because AAVs are fully tracked vehicles over 10 feet wide and weighing up to 26 tons combat loaded, they can be expected to create large, deep ruts as they come ashore. However, this section only addresses effects produced by bringing craft just above the water line. Ruts at the waterline would be removed by wave action and rising tides and are not expected to pose a risk to hatchlings. The effects of ruts produced above the water line by AAVs are addressed in the *Ground Movement* section below.

Overall, use of AAVs for amphibious landing activities at night between 5/12 and 11/19 is LIKELY TO ADVERSELY AFFECT sea turtles. However, adherence to proper avoidance and minimization measures, as described following this narrative, can greatly reduce the potential for adverse impacts to sea turtle populations. Activities during the day are expected to have NO EFFECT.

Landing Craft Utility (LCU)

LCUs may land on SRI within the A-13B corridors (Figure A-39, A-25). A maximum of eight LCUs can be expected to land at SRI during the entire 10-day ARG/MEU training period. These LCU landings are expected to occur only during daylight to transport M1A1 tanks to and from the island.

Unlike the LCAC or the AAV, the LCU is not an amphibious craft and therefore would not come ashore on SRI. Instead, the LCU would maneuver as close to the shoreline as possible while maintaining the minimum required draft below the bow. The craft would then deploy a landing ramp onto the beachfront for exiting vehicles. Because LCUs do not come ashore, any damage done to the sand by the deployment of the landing ramp would occur at the waterline. LCU landings are not expected to produce ruts in the sand. Because LCU landings would only occur during daylight hours, nesting females would not be deterred from coming ashore in or near the landing area. The affects of troops and equipment moving from landing craft across the beachfront to roads on Eglin are addressed in the *Ground Movement* section.

Because the proposed LCU landings would only occur during daytime hours, these landings expected to have NO EFFECT on sea turtles.

Zodiacs

A maximum of 78 Zodiacs may land at SRI during the 10-day ARG/MEU training period. Of this total, a maximum of 18 boats would land on the island at any one time. Zodiacs may land at any point along the shore from Test Area A-15 to site A-11A. Test Site A-12 may also be the insertion point for a small boat raid. However, this site would be approached from the north side of the island and would not impact the beachfront.

During small boat raid (18 Zodiacs at a time) and direct action (6 Zodiacs) training activities, Zodiacs may be pulled up onto the beach and left on the beachfront during a 6 to 8 hour nighttime exercise. Drag marks may obscure evidence of sea turtle nesting and hatching activity in the landing area. Although female sea turtles may be discouraged from nesting where Zodiacs are left on the beachfront, no more than 18 Zodiacs would be left on the beachfront at any one time, and therefore the affected area would be relatively small. Depending on the Zodiac model

employed, the size of a single Zodiac can vary from 5 feet 9 inches to 7 inches in width and from 13 feet 9 inches to 17 feet 5 inches in length. If small boat raids were conducted with larger craft and each craft was stationed within 6 feet of the others, the total footprint for 18 craft would cover an estimated 4,212 square feet (234 feet wide by 18 feet long) of beachfront. Calculations of peak nesting rates (see Munitions Use discussion above) show that the estimated number of nests deterred in a half-mile area around a zodiac staging area over the course of 5 Zodiac landing/staging events (4 small boat raids and 1 direct action) would be 0.065 loggerhead turtle nests (0.013 multiplied by 5) and 0.0045 green turtle nests (0.0009 multiplied by 5). In reality, the area of deterrence created by the staging of 18 Zodiac boats would be much less than a half-mile, reducing the rate of deterrence even further. To prevent direct impact to nests and/or the obscuring of sea turtle tracks within landing and staging areas, these areas would be surveyed immediately before night amphibious landings. A surveyor would be posted at Zodiac staging areas for the duration of nighttime activities to prevent nesting females from becoming entrapped among staged craft.

With proper avoidance and minimization measures in place (see below), the landing and staging of Zodiacs on the beachfront at night during nesting/hatching season is NOT LIKELY TO ADVERSELY AFFECT sea turtle reproduction on SRI. Activities during the day are expected to have NO EFFECT.

Amphibious Landing Avoidance and Minimization Measures

Avoidance and minimization procedures that would be employed to minimize impacts to sea turtles from amphibious landings associated with ARG/MEU training include:

- The size of night landing corridors would be limited to the minimum needed to accomplish mission (Figure A-39, Appendix A).
- Proposed landing corridors would be marked so as to be easily distinguished by the operators of amphibious landing vehicles/craft.
- All landing areas would be surveyed immediately prior to night operations.
- All known sea turtle nests would be marked and protected in accordance with established Eglin Natural Resources Branch protocol. An additional 10-foot boundary would be marked around all nests occurring within the Proposed Action area (Figure A-39) using infrared tape.
- All nests within landing corridors would be relocated at least 50 feet from the movement corridor to the toe of the nearest primary dune.
- During nighttime activities, surveyors would be posted at any nest that is beyond 50 days of incubation and less than 0.5 miles from the landing area.
- Wherever practicable, watercraft staged on the beach would be placed at the water’s edge.
- When craft are staged on the beachfront during nighttime operations, a surveyor would be posted at the staging area to prevent nesting females from becoming entrapped among the staged craft.

- All lighting on the beach would be reduced to the extent practicable through use of blinders and low-level lighting.
- When ARG/MEU amphibious landings on SRI occur between 1 May and 1 September, sea turtle surveys would be conducted every morning in accordance with established INBS and Eglin Natural Resources Branch protocol.

Ground Movement

LCACs, AAVs, M1A1 tanks, bulldozers/earthmovers, and various wheeled vehicles are expected to operate within designated vehicle movement corridors and on established roads. Troop movements can occur anywhere within the designated troop movement area. Figure A-39, Appendix A of the ARG/MEU EA, shows vehicular and troop movement corridors on SRI. The possible impact of each vehicle type is addressed individually below. A summary of the effects of ground movement and detailed recommendations for avoidance and minimization measures follow.

Landing Craft Air Cushion (LCAC)

LCACs may cross SRI within the crossover corridor west of A-13B as many as 134 times during the course of the 10-day ARG/MEU training cycle to transport weapons systems, equipment, cargo and personnel from ship to shore across the barrier island.

Because the vehicle rides on a cushion of air approximately 4 feet above the surface of the sand, LCAC movement is not expected to produce ruts in the sand. As previously discussed, the general disturbance generated by this craft would most likely deter nesting females from entering movement corridors. LCAC operations may also disturb or directly impact adults or emerging hatchlings in or near the movement corridors.

Sand blown from beneath the air cushion may obscure evidence of sea turtle nesting activity, interfering with surveyors' ability to accurately locate, mark, and protect nest sites. To avoid this, the LCAC movement corridor would be surveyed for sea turtle activity immediately prior to nighttime operation. A robust primary dune system helps to prevent sea turtle hatchling disorientation by shading out inland light. Dunes also provide an important physical buffer against storms. Repeated disturbance to dunes can result in their destabilization and destruction, however, it is not likely that ARG/MEU-related LCAC operation within the A-13B corridor would result in a significant change in dune height. Observation of LCAC sand displacement showed that two LCAC passes resulted in only a 0.750 decrease in dune elevation (SAIC, 1998). These measurements were taken immediately after LCAC crossings occurred. If more time had elapsed between the crossings and the measurements, it is likely that any sand displacement caused by the LCAC would be overshadowed by the amount of natural, wind-driven sand displacement. Moreover, LCACs may cross SRI anywhere within the 45.6-acre corridor at A-13B. LCACs may not use the same exact path of travel through the corridor, and it is likely that the sand displacement caused by one LCAC would be counteracted by the displacement of another. In addition, the risk of dune impact is further reduced by the fact that very few dunes currently occur within the A-13B crossover area. To mitigate any risk to these few existing dunes, vehicle operators would be instructed to avoid all dunes over 5 feet high.

LCACs are not expected to traverse along the shoreline outside of the A-13B crossover corridor. However, if such movement were necessary, it would only occur within the designated lateral movement corridor between sites A-15 and A-11A (Figure A-39, A-25) and as close to the water line as possible. If for any reason LCACs must come above MHW in the lateral corridor, they would operate a minimum of 50 feet away from the primary dune line. As with all ground movement, vehicle operators would be instructed to avoid dunes over 5 feet high, thereby reducing impacts to nesting habitat.

Overall, use of LCACs during ground movement at night between 5/12 and 11/19 is LIKELY TO ADVERSELY AFFECT sea turtles. However, adherence to proper avoidance and minimization measures, as described following this narrative, can greatly reduce the potential for adverse impacts to sea turtle populations. Activities during the day are expected to have NO EFFECT.

Amphibious Assault Vehicle (AAV)

AAVs would cross the island at the A-13B corridor a total of 52 times. These vehicles would also cross from the beachfront to the road within the A-11A corridor a total of 26 times. A maximum of 13 AAVs could cross SRI during any single mission activity.

AAVs may land at any point between test sites A-15 and A-11A and traverse the shoreline between these sites through the designated lateral movement corridor, at least 50 feet from the primary dune line. As with all night vehicle operations on the beachfront, AAVs pose a threat of direct physical impact to nests, adults, and hatchlings within the movement corridors. Disturbance from these craft may also deter nesting females from entering movement corridors during night operations. As mentioned in the discussion of amphibious landings, AAVs can be expected to create ruts within the movement corridors, and such ruts may impede hatchling movement or obscure evidence of nesting activity. However, these ruts would be removed as soon as is practicable, and before the next evening's nesting cycle. Furthermore, to preserve nesting habitat, vehicle movement corridors would be clearly marked and vehicle operators would be instructed to avoid all dunes more than 5 feet high within the corridors.

Overall, use of AAVs during ground movement at night between 5/12 and 11/19 is LIKELY TO ADVERSELY AFFECT sea turtles. However, adherence to proper avoidance and minimization measures, as described following this narrative, can greatly reduce the potential for adverse impacts to sea turtle populations. Activities during the day are expected to have NO EFFECT.

M1A1 Tanks

During the course of the 10-day ARG/MEU training cycle, a total of four M1A1 tanks may be transported to SRI via LCU during daytime operations. Tanks would move from landing craft, across approximately 575 feet of beachfront, through a 100-yard corridor to the road at test site A-10 and/or site A-13B (Appendix A, Figure A-39) where they would be loaded onto trucks for transport inland. Tanks may also return to landing craft using this same route during the MEU withdrawal, bringing the total number of beachfront tank crossings at A-10 to eight.

Because tanks would move through this corridor only during daylight hours, and all nests would be relocated out of the 100-yard corridor, there is no risk of direct impact to nesting adults or emerging hatchlings. Like AAVs, M1A1 tanks are large, fully tracked vehicles, and would create deep ruts within the A-10 corridor. If tank ruts were removed before sunset, there should be no impact to emerging hatchlings. As with all ground movement, vehicle operators would be instructed to avoid dunes over 5 feet high, thereby reducing impacts to nesting habitat.

With proper avoidance and minimization measures in place (see below), the movement of M1A1 tanks at night during nesting/hatching season is NOT LIKELY TO ADVERSELY AFFECT sea turtle reproduction on SRI. Activities during the day are expected to have NO EFFECT.

Bulldozers/Earthmovers

It is unlikely that bulldozers and/or earthmovers would be needed for activities on SRI. However, it is possible that sand escarpments along the shoreline within the three designated access/crossover corridors would need to be removed to make the landing of amphibious vehicles at these sites possible. If bulldozers/earthmovers were used on the beachfront in this manner, they would only be used during daylight hours and would therefore not be expected to pose a direct threat to adult sea turtles or hatchlings. Because all nests would be relocated out of the landing corridors to the toe of the dune line, machinery is not expected to impact nests. As with all vehicle movement on the beachfront, ruts would be removed before sunset. To preserve nesting habitat, vehicle movement corridors would be clearly marked and vehicle operators would be instructed to avoid all dunes over 5 feet high within the corridors.

With proper avoidance and minimization measures in place (see below), the use of bulldozers/earthmovers would have NO EFFECT on sea turtle reproduction on SRI.

Wheeled Vehicles

Various wheeled vehicles, including HMMWVs, seven-ton trucks, M-89 towed howitzers, and fuel trucks may operate on SRI at any time during the 10-day ARG/MEU action. Movement of these vehicles would be limited for the most part to daytime operations on established roads. Under these circumstances, such vehicles are not expected to affect sea turtles on SRI. However, wheeled vehicles may on occasion operate during day or night within designated crossover/access corridors or along the beachfront. As with tracked vehicle movement on the beachfront, adults would be discouraged from nesting in the movement area and ruts may impede the movement of hatchlings. Ruts would be removed as soon as practicable. Headlights from wheeled vehicles operating within 0.5 miles of a hatching nest may pose a disorientation threat. There is also a risk of direct physical impact to nests, adults, and hatchlings in the movement corridors. To prevent this, all corridors would be surveyed for evidence of sea turtle activity immediately prior to night activities. As with all ground movement, vehicle operators would be instructed to stay within the designated vehicle movement corridors and avoid dunes over 5 feet high, thereby reducing impacts to nesting habitat.

Overall, use of wheeled vehicles on the beach at night during ground movement between 5/12 and 11/19 is LIKELY TO ADVERSELY AFFECT sea turtles. However, adherence to

proper avoidance and minimization measures, as described following this narrative, can greatly reduce the potential for adverse impacts to sea turtle populations. Activities during the day are expected to have NO EFFECT.

Troop Movements

Troop movement may occur during the day or night anywhere east of the western boundary of INBS zone 9 and west of the eastern boundary of zone 18 (Appendix A, Figure A-39). A maximum of 200 troops would move on the island at any one time during the MEU exercise. A total of 600 troops may use the island during the entire 10-day period. As with other types of ground movement, there is a risk of direct impact to nesting females, hatchlings, and nests during night operations on the beachfront. Heavy troop movement may obscure evidence of sea turtle crawls and nests. To prevent this, all corridors would be surveyed for evidence of sea turtle activity immediately prior to night activities. Troops would be instructed to remain within the designated troop movement corridor and avoid dunes over 5 feet high, thereby reducing impacts to nesting habitat.

Overall, troop movement on the beach at night during ground movement between 5/12 and 11/19 is LIKELY TO ADVERSELY AFFECT sea turtles. However, adherence to proper avoidance and minimization measures, as described following this narrative, can greatly reduce the potential for adverse impacts to sea turtle populations. Activities during the day are expected to have NO EFFECT.

Ground Movement Avoidance and Minimization Measures

- The size of vehicular movement corridors would be limited to the minimum necessary for the mission. Lateral movement along the beachfront would only occur between test sites A-15 and A-11A, as close to the waterline as possible and at least 50 feet below the primary dune line.
- Proposed landing corridors would be marked so as to be easily distinguished by the operators of amphibious landing vehicles/craft.
- To protect sea turtle nesting habitat within movement corridors, all vehicles and troops would avoid all dunes over 5 feet high.
- All nests that are laid within crossover and access corridors (A-13B , A-11A, and A-10) would be relocated laterally along the primary dune line to a site at least 50 feet away from all vehicular movement corridors.
- Nests occurring less than 50 feet above the water line between A-13B and A-11A would be relocated northward to the toe of the nearest primary dune.
- Nests occurring between A-13B and A-11A where mean high water (MHW) is less than 50 feet from the primary dune line would be relocated to the primary dune line where MHW is at least 50 feet away.
- All known sea turtle nests would be marked and protected in accordance with established Eglin Natural Resources Branch protocol. An additional 10-foot boundary would be

marked around all nests occurring within Proposed Action area (Figure A-39) using infrared tape.

- Movement corridors would be surveyed immediately prior to all nighttime operations on the beachfront.
- During nighttime operations, a surveyor would be posted by all nests beyond 50 days of incubation that are less than 0.5 miles from the area of activity.
- To the extent practicable, vehicles and watercraft would be staged at water's edge. Whenever it is necessary to stage vehicles on the beachfront, silt screens would be installed around the base of the vehicles, or a surveyor would be stationed near vehicles to watch for nesting females.
- All ruts deeper than 2 inches created during daytime operations would be removed before sunset. All such ruts created during night operations would be removed immediately following the operation completion.
- When MEU ground movements on SRI occur between 1 May and 1 September, sea turtle surveys would be conducted every morning in accordance with established INBS and Eglin Natural Resources Branch protocol.

Summary Table

In summary, adverse impacts to sea turtles would be associated with nighttime amphibious landing activities and ground movements of vehicles and troops during nesting/hatching season (Table D-11). Impacts would mainly be in the form of nesting deterrence from noise and commotion. Calculations of nightly nesting rates reveal that during peak nesting season, an estimated 1.8 loggerhead and 0.13 green turtle nesting emergences could occur within the Proposed Action area over a 10-day period. Direct physical impact to adults, hatchlings, and/or nests is unlikely, as nests would be well marked and surveyors would be present on the beach to alert ARG/MEU personnel to the presence of any turtles. Based on turtle nesting data for the last 13 years (Figure D-3), approximately 20 nests could occur within the action area on SRI during an average green and loggerhead turtle nesting year (8 green, 11 loggerhead, and less than 1 leatherback). If all occurred prior to or during the 10-day ARG/MEU training exercise, all may potentially need to be relocated. Although an avoidance and minimization procedure, relocation of nests would impact sea turtle eggs, potentially affecting egg viability and possibly resulting in mortality. Whenever possible, nests would be left in situ; however, nests would be relocated in accordance with FWC Marine Turtle Conservation Guidelines (2002), and all nests would be monitored daily by permitted surveyors.

Table D-11. Summary Effects Determination for Sea Turtles

<table>
<tr><th rowspan="3">Training Activity*</th><th colspan="10">Element</th></tr>
<tr><th colspan="2">Munitions Use</th><th colspan="2">Pyrotechnics Use</th><th colspan="2">Aviation Operations</th><th colspan="2">Amphibious Landing</th><th colspan="2">Ground Movement</th></tr>
<tr><th>Day</th><th>Night</th><th>Day</th><th>Night</th><th>Day</th><th>Night</th><th>Day</th><th>Night</th><th>Day</th><th>Night</th></tr>
<tr><td>Insertion of Forward Command Element</td><td colspan="2">N/A</td><td colspan="2">N/A</td><td colspan="2">N/A</td><td rowspan="2">NE</td><td rowspan="2">NLAA</td><td rowspan="2">NE</td><td>NLAA</td></tr>
<tr><td>Insertion of R&S Teams</td><td>NE</td><td>NLAA</td><td>N/A</td><td>NLAA</td><td>N/A</td><td>NLAA</td><td>LAA</td></tr>
<tr><td>Helicopter Raid</td><td colspan="2" rowspan="2">N/A</td><td colspan="2" rowspan="2">N/A</td><td colspan="2" rowspan="2">N/A</td><td colspan="4" rowspan="2">N/A</td></tr>
<tr><td>Rapid Ground Refueling</td></tr>
<tr><td>Small Boat Raid</td><td>N/A</td><td>NLAA</td><td>N/A</td><td rowspan="3">NLAA</td><td colspan="2">N/A</td><td rowspan="3">NE</td><td>NLAA</td><td rowspan="3">NE</td><td rowspan="3">LAA</td></tr>
<tr><td>Amphibious Landing Rehearsal</td><td colspan="2">N/A</td><td rowspan="2">NE</td><td colspan="2" rowspan="2">NE</td><td rowspan="2">LAA</td></tr>
<tr><td>Mechanized Raid Wet</td><td>NE</td><td>NLAA</td></tr>
<tr><td>Mechanized Raid Dry</td><td colspan="2">N/A</td><td colspan="4">N/A</td><td colspan="4">N/A</td></tr>
<tr><td>MEU Landing</td><td colspan="2" rowspan="3">N/A</td><td colspan="4">NE</td><td>NLAA</td><td>LAA</td><td>NE</td><td>LAA</td></tr>
<tr><td>SACEX</td><td colspan="4" rowspan="2">N/A</td><td colspan="4" rowspan="2">N/A</td></tr>
<tr><td>Live Fire and/or Maneuver</td></tr>
<tr><td>Direct Action</td><td>N/A</td><td>NLAA</td><td>N/A</td><td>NLAA</td><td>N/A</td><td>NLAA</td><td>N/A</td><td>NLAA</td><td>N/A</td><td>NLAA</td></tr>
<tr><td>Non-Combatant Evacuation Operation</td><td colspan="2" rowspan="2">N/A</td><td colspan="2" rowspan="2">N/A</td><td colspan="2">N/A</td><td colspan="4">N/A</td></tr>
<tr><td>Withdrawal</td><td colspan="2">NE</td><td>NLAA</td><td>LAA</td><td>NE</td><td>LAA</td></tr>
</table>

*If conducted during turtle nesting/hatching season (5/12 – 11/19)
NE = No Effect
NLAA = Not Likely to Adversely Affect
LAA = Likely to Adversely Affect
N/A = Not Applicable

Piping Plover (*Charadrius melodus*)

Piping plovers can be expected to leave northern breeding grounds and arrive in wintering habitat as early as mid-July, and return north again to breed in March (USFWS, 2001). Eglin AFB Natural Resources Branch and volunteer personnel have periodically conducted shorebird surveys on SRI during the wintering season. These surveys included participation in the International Piping Plover Census in January of 1991, 1996, and 2001. Piping plovers were not sighted on Eglin's property during any of these official surveys. During the 2001 survey, the closest sighting occurred at Navarre Beach State Park and Big Sabine Point (Ferland and Haig, 2001). Volunteers from the Choctawhatchee Audubon Society have conducted periodic shorebird surveys on SRI during which six piping plovers were documented foraging within the designated critical habitat. Two shorebird surveys were conducted during January and February of 2003, and no piping plovers were sighted on SRI (Fenimore, 2003).

Although only a small section of SRI/OI has been designated as critical habitat (see *Critical Habitat* discussion below), piping plovers may be found any place that affords proper foraging and sheltering resources. Piping plovers are known to forage in exposed wet sand areas such as wash zones, intertidal ocean beachfronts, wrack lines, washover passes, mud and sand flats, ephemeral ponds, and salt marshes. They are also known to use adjacent areas for sheltering in dunes, debris, and sparse vegetation. All of these habitat types can be found on Eglin's portion of SRI/OI. Although it is possible that piping plovers could use any one of these habitat types at any time during the wintering season, studies have shown that wintering plovers spend

76 percent of their time foraging for invertebrates found just below the surface of wet sand (Johnson and Baldassarre, 1988). Therefore, during the wintering season, MEU operative elements are more likely to encounter piping plovers in shoreline areas as opposed to inland movement corridors.

Piping plovers have only been documented using critical habitat areas on the north shore of SRI. However, research indicates that patterns of piping plover habitat usage can be very complex. Plovers could feasibly use several locations on the island for foraging, roosting, or sheltering at any time, day or night. Therefore, if the Proposed Action takes place during the piping plover wintering season (mid-July through early-March), it is possible that piping plovers may be present in the action area.

MEU activities taking place outside the plover wintering period would have NO EFFECT to wintering piping plover populations.

Munitions Use

Munitions use on SRI would be confined to small arms blank firing during direct actions, small boat raids, and the mechanized raid wet. These actions may occur at test sites A-15, A-11A, and/or A-12. In the unlikely event that a piping plover is found in or near these areas, noise associated with the firing of blank munitions can be expected to flush the bird from the landing area, possibly causing stress and extra caloric expenditure. During this time, displaced plovers may simply move on to undisturbed foraging areas nearby.

Firing of small arms blanks on SRI during the wintering season is NOT LIKELY TO ADVERSELY AFFECT the wintering piping plover population on SRI.

Pyrotechnics Use

Smokes, signal flares, and simulators may be used on SRI during the mechanized raid wet, small boat raid, MEU landing, and withdrawal. Unlike munitions, there is little noise associated with the use of smokes or flares. The use of these items during operations on SRI is not expected to add to the level of disturbance caused by the operation itself (see discussions of landings and ground movements below). However, the noise produced by use of simulators is comparable to that of small arms blanks firing, as discussed above.

The proposed use of pyrotechnics on SRI is NOT LIKELY TO ADVERSELY AFFECT wintering piping plover population on SRI.

Aviation Operations

Helicopter and fixed-wing aircraft may provide air support and surveillance for any training activity conducted on SRI; however, due to noise concerns for populated areas just across Santa Rosa Sound, all flights over the island would be no lower than an altitude of 500 feet. Due to the height of island overflights, no impact to piping plovers is expected from aviation operations over SRI.

Helicopter landings on SRI are unlikely due to the fact that rudder wash can cause dangerous whiteout conditions in sandy environments. However, during nighttime R&S insertions, troops may repel onto one of two designated HLZs on the island from Huey or CH-46 helicopters a maximum of five times over the course of the 10-day ARG/MEU exercise. During these troop insertions, helicopters may hover at an altitude of about 20 to 50 feet for a maximum of 5 minutes while troops deploy. All helicopter landings and low altitude troop insertions would occur beyond the primary dune line with no effect to possible plover foraging areas near the shore. In the unlikely event that a piping plover is found in or near the landing/troop insertion area, the bird would be temporarily flushed from the area. No direct physical impact from helicopter operations is expected.

Because insertions of this manner would be brief and localized behind the primary dune line, aviation operations over SRI is NOT LIKELY TO ADVERSELY AFFECT the wintering piping plover population.

Amphibious Landings

Figure A-39 and A-25, Appendix A of the ARG/MEU EA, show the amphibious landing corridors proposed for SRI. LCACs, AAVs, LCUs, and Zodiacs would be employed during amphibious landing/withdrawal activities on SRI. By definition, the amphibious landing portion of an exercise involves bringing the craft just above the water line. The impacts of crafts moving above the water line are addressed in the *Ground Movement* section below. The possible impact of each craft is addressed individually, and a summary of the effects of amphibious landing and detailed recommendations for avoidance and minimization measures follow.

During the 10-day ARG/MEU training cycle, LCACs may land on the south shore of SRI a total of 66 times to transport troops vehicles and equipment to the mainland, and would land on the north shore of SRI a total of 66 times while returning to amphibious shipping from mainland Eglin. These landings would occur within the designated landing corridor at A-13B. AAVs may land at any point between test sites A-15 and A-11A with concentrated landing activity at designated crossing/access corridors. Thirteen AAV landings and withdrawals are expected to occur within the A-11A corridor. AAVs are also expected to land at both the north shore and the south shore of the A-13B crossing corridor 52 times during the course of ARG/MEU operations. LCUs may land on SRI within the A-11A or A-10 access corridor. No more than 8 LCU landings are expected on SRI during the entire 10-day ARG/MEU training period. A maximum of 46 Zodiacs may land at SRI during the 10-day ARG/MEU training period, and of this total, a maximum of 18 boats would land on the island at any one time.

As stated previously, the only documented sighting of a piping plover occurred on the north side of the island within designated critical habitat. This critical habitat area is more than three miles west of the LCAC/AAV crossover corridor. Therefore, amphibious craft landings at either the north or south shore within this corridor are not expected to pose a threat to critical habitat. However, due to the complexity of plover habitat usage patterns, the presence of piping plovers in landing areas cannot be ruled out. It is possible, though not likely, those amphibious craft landings may cause direct physical impact to an individual plover. It is more likely that amphibious craft landings would only serve to flush the bird from the landing area, possibly causing stress and extra caloric expenditure. The disturbance generated by sustained amphibious

landing operations would be sufficient to keep piping plovers from foraging in the landing area during the course of the operation. During this time, displaced plovers may simply move on to undisturbed foraging areas.

Because the risk of direct physical impact is slight and indirect disturbance would be temporary and localized in nature, amphibious craft landings on SRI are NOT LIKELY TO ADVERSELY AFFECT the wintering piping plover population.

Ground Movement

LCACs, AAVs, M1A1 tanks, bulldozers/earthmovers, and various wheeled vehicles are expected to operate within designated vehicle movement corridors and on established roads. Troop movements can occur anywhere within the designated troop movement area. Figure A-39, Appendix A of the ARG/MEU EA, shows vehicular and troop movement corridors on SRI. The possible impact of each vehicle type is addressed individually below. A summary of the effects of ground movement and detailed recommendations for avoidance and minimization measures follow.

LCACs may cross SRI within the crossover corridor west of A-13B as many as 134 times during the course of the 10-day ARG/MEU training cycle to transport weapons systems, equipment, cargo, and personnel from ship to shore across the barrier island. AAVs would cross the island at the A-13B corridor a total of 52 times. These vehicles would also cross from the beachfront to the road within the A-11A corridor a total of 26 times. A maximum of 13 AAVs could cross SRI during any single mission activity. During the course of the 10-day ARG/MEU training cycle, a total of four M1A1 tanks may be transported to SRI via LCU during daytime operations. Tanks would move from landing craft, across approximately 575 feet of beachfront, through a 100-yard corridor to the road at test site A-10 (Appendix A, Figure A-39) where they would be loaded onto trucks and transported inland. Tanks may also return to landing craft using this same route during the MEU withdrawal, bringing the total number of south shore tank crossings at A-10 to eight.

It is unlikely that bulldozers and/or earthmovers would be needed for activities on SRI. However, it is possible that sand escarpments along the shoreline within the three designated access/crossover corridors would need to be removed to make the landing of amphibious vehicles at these sites possible. If bulldozers/earthmovers were used on the beachfront in this manner, they would be used for only a limited period of time during daylight hours. Various wheeled vehicles, including HMMWVs, seven-ton trucks, M-89 towed howitzers, and fuel trucks may operate on SRI at any time during the 10-day ARG/MEU action. Movement of these vehicles would be limited for the most part to daytime operations on established roads.

Troop movement may occur during the day or night anywhere east of the western boundary of INBS zone 9 and west of the eastern boundary of zone 18. This includes possible troop movement in or near possible piping plover foraging areas (sand/mud flats) on the north shore of the island. A maximum of 200 troops would move on the island at any one time during the MEU exercise. Movements are expected to be relatively short in duration, as troops would only be moving through the area to inland objectives and are not expected to bivouac on the island. A total of 600 troops may use the island during the entire 10-day period. Although large-scale

troop movements have the potential to impact more areas in a greater variety of habitat types than localized vehicle use, the impacts are expected to be relatively slight. Troop movement should be less disturbing to piping plovers than vehicular movements. Plovers may be flushed from a movement area only to return after troops have moved through. Unlike vehicular movement, there is no risk of direct physical impact to plovers from troop movement. However, concentrated troop movement should be limited to areas outside of fragile foraging habitat (mud/sand flats) on the north shore of the island.

As stated earlier, one study suggests that wintering plovers spend as much as 76 percent of their time foraging (Johnson and Baldassarre, 1988). Because of this, piping plovers can be expected to use dune areas less often than foraging habitat, further decreasing the already slight risk of impact to plovers during inland vehicle operations. However, given the complexity of plover habitat usage patterns discussed above, the presence of piping plovers in inland areas during ground movement exercises cannot be ruled out. It is possible, though very unlikely, that ground movement operations in the designated movement corridors may cause direct physical impact to an individual plover. It is more likely that ground movement activities would only flush the bird, causing stress and extra caloric expenditure. Displaced plovers may simply move on to undisturbed foraging areas during ground movement activities.

The risk of direct physical impact during ground movements is slight, and indirect disturbance would be temporary and localized in nature. Ground movement activities on SRI are NOT LIKELY TO ADVERSELY AFFECT the wintering piping plover population.

Piping Plover Critical Habitat

The preservation of critical habitat in wintering areas is important to the survival of piping plover populations. Quality winter foraging and roosting is necessary if adults are to survive, migrate back to breeding sites, and nest successfully (USFWS, 2001). The Navarre Beach piping plover critical habitat (USFWS Unit FL-3) consists of 118 acres in Escambia and Santa Rosa Counties. Eglin Air Force Base and SRI Authority own the majority of the unit. Within property administered by Eglin, critical habitat is situated on the north shore of Santa Rosa/Okaloosa Island (SRI/OI) west of Test Site A-15. Activities associated with ARG/MEU training would not occur in or near piping plover critical habitat.

Because activities ARG/MEU would not occur in or near designated critical habitat, the proposed activities would have NO EFFECT on designated piping plover critical habitat on SRI.

Avoidance and Minimization Measures for ARG/MEU Training

- Ensure that all activities occur outside of designated piping plover critical habitat.
- Limit large-scale troop movements to areas away from fragile foraging habitat on the north shore of SRI.
- Use only designated landing areas for amphibious operations on the north side of SRI (A-12 and A-13B).

- If the Proposed Action is scheduled during the wintering season, thorough shorebird surveys would be conducted immediately before and after the action, along the south and north shores of SRI, and within vehicular movement corridors.
- If piping plovers are documented in the Proposed Action areas, measures would be taken to mark and protect the habitat and troop/vehicular movements would be adjusted accordingly.
- Conduct annual piping plover surveys for all Eglin properties on SRI and continue participation in the International Piping Plover Census if conducted every five years.

Summary Table

Table D-12. Summary Effects Determination for Piping Plover

<table>
<tr><th rowspan="2">Training Activity</th><th colspan="5">Element</th></tr>
<tr><th>Munitions Use</th><th>Pyrotechnics Use</th><th>Aviation Operations</th><th>Amphibious Landing</th><th>Ground Movement</th></tr>
<tr><td>Insertion of Forward Command Element</td><td rowspan="4">N/A</td><td rowspan="9">NLAA</td><td rowspan="2">NLAA</td><td colspan="2" rowspan="2">NLAA</td></tr>
<tr><td>Insertion of R&S Teams</td></tr>
<tr><td>Helicopter Raid</td><td rowspan="3">N/A</td><td colspan="2" rowspan="2">N/A</td></tr>
<tr><td>Rapid Ground Refueling</td></tr>
<tr><td>Small Boat Raid</td><td>NLAA</td><td colspan="2" rowspan="3">NLAA</td></tr>
<tr><td>Amphibious Landing Rehearsal</td><td>N/A</td><td>NLAA</td></tr>
<tr><td>Mechanized Raid Wet</td><td>NLAA</td><td rowspan="2">N/A</td></tr>
<tr><td>Mechanized Raid Dry</td><td rowspan="4">N/A</td><td colspan="2">N/A</td></tr>
<tr><td>MEU Landing</td><td>NLAA</td><td colspan="2">NLAA</td></tr>
<tr><td>SACEX</td><td colspan="2" rowspan="2">N/A</td><td colspan="2" rowspan="2">N/A</td></tr>
<tr><td>Live Fire and/or Maneuver</td></tr>
<tr><td>Direct Action</td><td colspan="2">NE</td><td>N/A</td><td colspan="2">NLAA</td></tr>
<tr><td>Non-Combatant Evacuation Operation</td><td colspan="5">N/A</td></tr>
<tr><td>Withdrawal</td><td>N/A</td><td colspan="4">NLAA</td></tr>
</table>

*Activities would have NO EFFECT to plover critical habitat.
NE = No Effect
NLAA = Not Likely to Adversely Affect
N/A = Not Applicable

Bald Eagle (*Haliaeetus leucocephalus*)

Bald eagle nests occur on the Eglin Reservation near TA A-22 on Eglin's main base. Although LCACs may land at TA A-22 during some ARG/MEU activities, the eagle nest is over a mile from the site, well outside of the secondary buffer for the species. Additionally, the LCAC would remain at least 1,500 from the shoreline when passing the eagle's nest. As a result, ARG/MEU readiness training would have **NO EFFECT** on bald eagles associated with Eglin AFB.

Red-cockaded Woodpecker (*Picoides borealis)*

The RCW inhabits the interstitial areas of the Eglin reservation. On Eglin, the RCW typically inhabits mature, open stands of longleaf pine. The RCW does not migrate and maintains year-round territories near nesting and roosting trees (Hooper et al., 1980). Studies by DeLotelle et al. (1987) in central Florida found that RCWs foraged primarily in longleaf pine and pond

cypress stands with dense ground cover of broomsedge bluestem (*Andropogon virginicus*). The birds will abandon nest cavities when the understory reaches the height of the cavity entrance.

An RCW cluster typically encompasses about 10 acres with most cavity trees most likely within a 1,500-foot diameter circle. The RCW has shown some preference for mature longleaf pine over other pine species as a cavity tree with the average age of longleaf pines in which new cavities have been excavated being 95 years. Cavity excavation may take several years and may be utilized by generations of birds for more than 50 years (Jackson et al., 1979).

High quality RCW forage habitat consists of open pine stands with tree dbh (diameter at breast height) averaging nine inches and larger. The birds forage in intermediate-aged (30 year old) and older pine stands, which also provide an important source of future trees for the construction of cavities (U.S. Air Force, 1996a). While 100 acres of mature pine is sufficient for some groups, clans commonly forage over several hundred acres where habitat conditions are not ideal (Jackson et al., 1979). The greatest threat to the RCW populations is loss and fragmentation of their habitat. As a result of active management, RCW populations on Eglin have continued to increase with the number of active clusters growing from an estimated 217 in 1994 to 308 in 2001 (Figure D-4) (Moranz and Hardesty, 1998; Petrick, 2001).

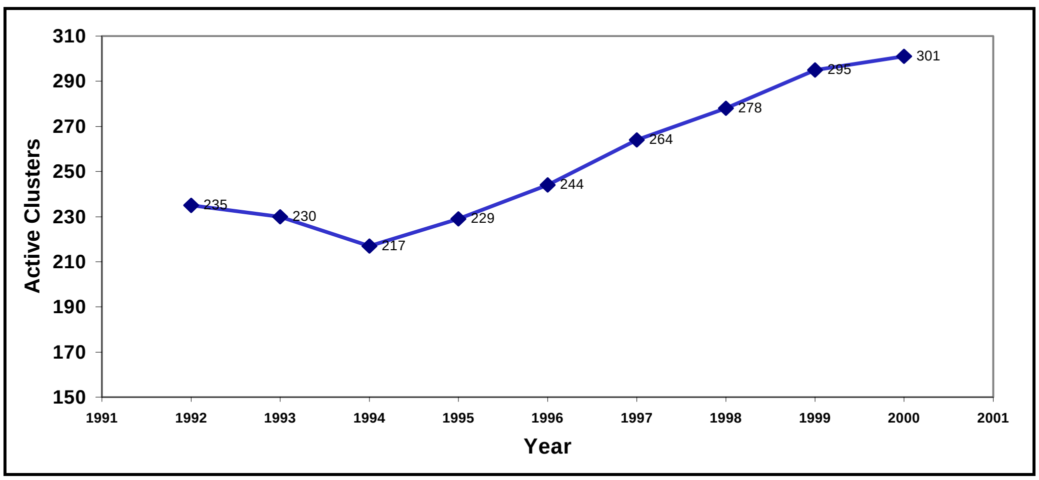

Figure D-4. Eglin RCW Population Trend

Amphibious Landings

Noise from amphibious landings would be concentrated at shoreline interfaces in the estuarine, riverine, and marine areas. No RCWs are located in these areas; therefore these activities would have **NO EFFECT** on RCWs.

Ground Movement

Insertion of forward command element and insertion of R&S teams are quiet in nature, involve small groups of personnel, and thus would not have noise effects on RCWs. Wheeled and tracked vehicle movement, foot traffic within the Eglin Military Complex from Wet and Dry Mechanical Raids, and MEU Landings (e.g., as vehicle proceed toward an objective) would potentially create noise and disturbance that could affect RCWs. Guidelines presented in the

U.S. Army Management Plan for RCWs and corresponding USFWS Biological Opinion would minimize potential noise and disturbance from Ground Movement activities on RCWs (U.S. Army, 1996; USFWS, 1996a). An important aspect of the Biological Opinion is the recognition of a 200-foot buffer zone around individual RCW cavity trees and the concurrence regarding the types of activities allowed within the 200-foot buffer that would not result in impacts to RCWs. Certain activities are not allowed; however, the USFWS agreed with the U.S. Army that transient foot traffic within 200 feet of RCW cavity trees would have no effect on RCWs, nor would transient vehicle traffic that stayed on existing trails or roads (U.S. Army, 1996; USFWS, 1996a). Transient activities involve maneuver type training, have low-intensity human activity, and a short-term (less than two hour) human presence (U.S. Army 1996). Activities that are not allowed within the 200-foot buffer zone include bivouacking and establishing command posts, and excavating/digging. Figure 2-1 of the ARG/MEU EA illustrates proposed wheeled and tracked vehicle routes.

Improvements to RR 259 would be required to accommodate vehicles. To provide ample clearance for MEU vehicles, RR 259 would require widening to a total cleared width of 32 feet. The removal of long leaf and slash pine trees from along the edge of the road would be required to support this width. Approximately 3.2 miles of RR 259 that would be widened is located within RCW foraging habitat. Figure A-74 shows the stretch of road being evaluated and the locations of the clusters that would be affected. Eglin Natural Resource Branch personnel conducted a survey on February 15-16, 2003, of all long leaf and slash pine trees greater than 10 inches dbh that are within RCW foraging areas and that fall within the 32-foot width. Seven clusters are impacted by tree removals associated with widening RR 259, as shown in Table D-13. For each cluster affected, the current foraging habitat has been calculated in terms of total number of trees with at least 10-inch dbh and also the current basal area. The basal area has also been calculated with consideration given to 15 percent sharing of trees for foraging among adjacent clusters. The total number of trees to be removed has been tabulated based upon the recent survey and the percent loss of trees for each cluster.

Table D-13. Potential Tree Removals Associated with Widening of RR 259

Cluster ID	Current Basal Area (ft^2)	Current BA (With 15% sharing)	Current Number of Trees (10 inch dbh or greater)	Number of trees to be removed (10 inch dbh or greater)	% Loss of Trees
500D	5,436	6,263	4,708	43	0.9
500F	5,515	7,521	4,773	38	0.7
500H	7,940	9,958	6,927	63	0.9
500I	7,944	10,138	6,938	45	0.6
500R	6,920	9,114	5,691	25	0.4
500Q	6,693	8,922	5,505	31	0.6
704F1	7,942	10,295	6,525	11	0.2
Total	48,390	62,211	41,067	256	0.6 (avg)

Based on these calculations, the percent loss to an individual cluster from road widening ranges from 0.2 to 0.9 percent. Therefore, all clusters would retain at least 99 percent of their current forage capacity if this project were implemented. The road-widening project would be coordinated with Natural Resource personnel, and no active cavity trees would be removed because the road widening would be adjusted so that the active trees can be avoided. There are currently six active cavity trees within 100 feet of the existing road. The habitat quality for all

the impacted clusters is very high, with an average burn frequency of every 3 years over the past 10 years. Because the quality of habitat is very good, no active trees would be removed, and the total loss of foraging habitat for each cluster is less than 1 percent, the Natural Resources Branch believes that implementing this road-widening project and removing the trees as identified is NOT LIKELY TO ADVERSELY AFFECT the RCW.

Ground movement activities are NOT LIKELY TO ADVERSELY AFFECT the RCW, provided these activities are transient in nature and that no digging/excavating or bivouacking near the cavity trees occur.

Aviation Operations

Noise from these activities would be centered around established airfields and throughout the airspace, generally at altitudes greater than 500 feet. Noise from helicopter raids would be concentrated at designated landing zones and over designated flight routes. There would be **NO EFFECT** on RCWs.

Munitions Use

Noise from SACEX and Live Fire/Maneuver activities would potentially affect RCWs (Figure A-73). For the SACEX training event, 250 ground-based Marines would be deployed to or within a 10-mile radius of TA C-52N to call in live fire from aircraft to targets on TA C-52N. Spotters, forward observers, and forward air controllers would employ laser finders/designators in the impact area. Major weapon systems would include 60- and 81-millimeter mortars and 155-millimeter howitzers. Aircraft would be AH-1W and UH-1N helicopter gunships and AV-8B and F/A-18 fixed-wing aircraft.

Artillery is proposed to be fired from the Eglin interstitial areas and test areas as far as 10 miles out from the center of TA C-52N, and aircraft would deliver live munitions to targets on this test area. The largest artillery, the 155-mm towed Howitzer would be fired from Test Area C-72, about eight miles away. The 60-mm and 81-mm mortars would be fired from less than five miles from the center of TA C-52N (Table D-14).

The firing duration would be from noon to midnight each day over a 72-hour period and would occur twice a year.

Table D-14. Artillery and Live Bombs Expended at TA C-52N During SACEX

Munition	Quantity
Artillery	
60 mm High Explosive	500
60 mm Illumination Round	75
81 mm Red Phosphorus Smoke Round	200
81 mm Illumination Round	200
81 mm High Explosive Round	800
155 mm Illumination Round	200
155 mm High Explosive Round	500
155 mm Green Bag Propelling Charge	700
Bombs	
MK83	10

Bomb and artillery noise impacts to RCWs were assessed. The maximum safe exposure level for humans without ear protection is 140 dBP (pressure decibels), a threshold that is based on exposure to 100 140-dBP noise events over a 24-hour period (U.S. Air Force, 1996). This conservative but reasonable threshold should suffice for estimating potential noise impacts to RCWs in the absence of any specific threshold for that species.

Noise from Mk-83s and artillery was modeled using the Noise Assessment and Prediction Model (NAPS) developed by Dr. Jim Luers of the Dayton Research Institute (Dayton Research Institute, 1990). The model estimates the peak noise intensity, expressed as pressure decibels (dBP), at ground level in all directions surrounding a blast source. The TNT-equivalent net explosive weight and desired weather conditions are input into the model, and noise in decibels by distance from the noise source is generated in the output. A favorable (meaning not conducive to propagating noise) weather scenario of no winds and no temperature inversions was input into the model for the Mk-83 and for the artillery and mortar muzzle blasts. Winds and inversions have little effect on noise greater than 140 dBP; thus other scenarios were not considered. Artillery shell detonations, which were not analyzed, would occur on the test area away from RCWs, whereas the firing of the artillery and, in particular, the smaller mortars (60 mm and 81 mm) could occur from off Test Area C-52N near RCWs. Thus, the propellant blast is the focus of the analysis for artillery noise.

Noise from Mk-83s

A total of 10 Mk-83s would be detonated on C-52N targets. Under favorable weather conditions of low winds and no temperature inversions, potentially harmful levels of noise (i.e. >140 dBP) from Mk-83 bombs delivered onto targets at C-52N would not reach RCW cavity trees. Though winds and inversions can propagate noise levels beyond what would occur under favorable weather conditions, the levels of noise that are of greatest concern (i.e. >140 dBP) expand outward from the point of detonation at a rate of speed that essentially negates wind effects. The nearest cavity tree is located over 4,000 feet away and would be exposed to between 130 and 125 dBP from an Mk-83 detonation. Typically, the number of annual detonations on TA C-52N range between 100 and 300 bombs with a net explosive weight 200 pounds or greater. Thus, it is unlikely that RCWs would experience any new noise from the Proposed Action outside of the norm for this area.

Noise from Artillery

Noise from artillery would be produced from the propellant charge or muzzle blast of the mortars. The shells would detonate on or near targets on TA C-52N and should not affect RCWs located just outside the boundaries of TA C-52N. The reason is that the explosion produced by the shell is relatively minor (compared to the previously analyzed Mk-83, which had no effect), involving at most about 20 pounds of explosive. Adverse noise from artillery shells exploding on TA C-52N would not reach RCW cavity trees.

Noise from the 155-mm propellant just over 140 dBP would extend outward to around 730 feet. Effects to RCWs near TA C-72 are unlikely since this noise level would most likely be confined to the test area boundaries for most firing scenarios (i.e., along test area roads). RCWs are not located on the test area, but do occur just beyond the southeast boundary. Most of the roads on

which the towed howitzer would travel (and be fired from) on TA C-72 are well within the interior of the test area. As a precaution, it is recommended that firing be conducted at least 1,000 feet from the southeast boundary. All other areas of TA C-72 would have no such constraints with respect to RCWs.

Noise from the 60- and 81-mm muzzle blasts would be produced by up to three pounds of propellant. Three pounds of explosive would send noise of about 140 dBP outward to a distance of roughly 500 feet. Since the 60- and 81-mm mortars would be fired from within five miles of TA C-52N, the number of active cavity tree clusters was examined with the aid of the Eglin AFB GIS. According to the GIS, there are 37 RCW cavity tree clusters that occupy less than 10 percent of the area within the five-mile firing radius, with ample space available to allow firing from several locations (Figure A-73). Given the available area, there are many potential firing positions that would have no noise effects on RCWs. However, placement of the 60 mm and 81 mm mortars within 500 feet of active RCW cavity trees, particularly at night or during nesting season when the birds would be at their nests, may have some adverse effect. Thus, it is recommended that 60- and 81-mm mortars be fired at a distance greater than 500 feet from any active RCW cavity tree. For consistency with other Marine training locations, it is recommended that this buffer distance be set at 200 meters (656 feet) to agree with Camp LeJeune Range Control Standard Operating Procedures (Figure A-73). This document states that no artillery or mortars are to be fired within 200 meters of an active RCW cavity tree (USMC, 2002).

Noise from Armored Vehicles

Groups of 135 Marines would operate on multiple ranges and conduct live fire on established live fire areas. This event includes fire and maneuver of the M1A1, AAV, LAV, and HMMWV-mounted TOW missiles, heavy machine vehicles, and small arms. In the event that RCW trees occur on these established live-fire areas, the same stipulations previously identified in the Ground Movement and Munitions Use discussions would apply.

Noise from munitions use is NOT LIKELY TO ADVERSELY AFFECT RCWs, provided the 200-meter buffer for artillery/mortar fire is observed.

Pyrotechnics Use

Use of smokes and obscurants would take place during most of the MEU exercises. These activities would take place outside the buffer area described under previous discussions. Pyrotechnics use is expected to have **NO EFFECT** on RCWs.

Avoidance and Minimization Measures

- No digging/excavating or bivouacking is allowed within 200 feet of identified active RCW cavity trees.
- Only transient foot traffic and vehicle traffic on established trails/roads are allowed within 200 feet of identified active RCW cavity trees.
- 60- and 81-mm mortars would only be fired at a distance greater than 656 feet (200 meters) from any identified active RCW cavity tree.

- Firing of the 155-mm Howitzer on TA C-72 would be conducted at least 1,000 feet from the southeast boundary.
- Pyrotechnics use would follow Eglin's Wildfire Specific Action Guide Restrictions.

Summary Table

Table D-15. Summary Effects Determination for Red-cockaded Woodpecker

<table>
<tr><th rowspan="2">Training Activity</th><th colspan="5">Element</th></tr>
<tr><th>Amphibious Landings</th><th>Ground Movement</th><th>Aviation Operations</th><th>Munitions Use</th><th>Pyrotechnics Use</th></tr>
<tr><td>Insertion of Forward Command Element</td><td rowspan="2">NE</td><td rowspan="3">NE</td><td>NE</td><td colspan="2" rowspan="2">N/A</td></tr>
<tr><td>Insertion of R&S Teams</td><td>N/A</td></tr>
<tr><td>Helicopter Raid</td><td rowspan="2">N/A</td><td rowspan="2">NE</td><td colspan="2">NE</td></tr>
<tr><td>Rapid Ground Refueling</td><td>N/A</td><td colspan="2">N/A</td></tr>
<tr><td>Small Boat Raid</td><td rowspan="3">NE</td><td rowspan="3">NE</td><td>N/A</td><td colspan="2">NE</td></tr>
<tr><td>Amphibious Landing Rehearsal</td><td>NE</td><td colspan="2">N/A</td></tr>
<tr><td>Mechanized Raid Wet</td><td rowspan="2">N/A</td><td>NE</td><td rowspan="3">NE</td></tr>
<tr><td>Mechanized Raid Dry</td><td>N/A</td><td rowspan="7">NLAA</td><td>NLAA</td></tr>
<tr><td>MEU Landing</td><td>NE</td><td rowspan="2">NE</td><td>N/A</td></tr>
<tr><td>SACEX</td><td rowspan="2">N/A</td><td rowspan="2">NLAA</td><td rowspan="5">N/A</td></tr>
<tr><td>Live Fire and/or Maneuver</td><td>N/A</td></tr>
<tr><td>Direct Action</td><td rowspan="3">NE</td><td rowspan="3">NE</td><td rowspan="2">NE</td></tr>
<tr><td>Non-Combatant Evacuation Operation</td></tr>
<tr><td>Withdrawal</td><td>N/A</td></tr>
</table>

NE = No Effect NLAA = Not Likely to Adversely Affect N/A = Not Applicable

Florida Perforate Lichen (*Cladonia perforata)*

Amphibious Landings

Figure A-39, Appendix A of the ARG/MEU EA, shows the amphibious landing corridors proposed for SRI. LCACs, AAVs, LCUs, and Zodiacs would be employed during amphibious landing/withdrawal activities on SRI.

Because amphibious craft landings would not occur within or near lichen areas, these activities are expected to have NO EFFECT to Florida perforate lichen on SRI.

Ground Movement

LCACs, AAVs, M1A1 tanks, bulldozers/earthmovers, various wheeled vehicles, and troops are expected to operate within designated vehicle movement corridors and on established roads. Troop movements can occur anywhere within the designated troop movement area. Figure A-39, Appendix A of the ARG/MEU EA, shows vehicular and troop movement corridors on SRI. The operation of LCACs, AAVs, tanks, bulldozers/earthmovers, and wheeled vehicles would occur on established roads or within designated off-road access/crossing corridors, and these roads and corridors are situated a safe distance away from lichen populations.

Ground movement involving vehicles is NOT LIKELY TO ADVERSELY AFFECT the Florida perforate lichen population on SRI.

Troops

Troop movement may occur anywhere east of the western boundary of INBS zone 9 and west of the eastern boundary of zone 18. A maximum of 200 troops would move on the island at any one time during the MEU exercise. A total of 600 troops may use the island during the entire 10-day period. Under the Proposed Action, substantial troop movement could occur less in close proximity to the westernmost lichen population (Figure A-39). Therefore, lichen populations and surrounding suitable habitat should be fenced and flagged using infrared tape with a 10-foot buffer to prevent inadvertent trampling of lichen mats.

With adherence to avoidance and minimization procedures as identified below, troop movement is NOT LIKELY TO ADVERSELY AFFECT Florida perforate lichen populations on SRI.

Avoidance and Minimization Measures

To ensure that proposed actions do not impact reintroduced populations of *Cladonia perforata* on SRI, the following measures should be followed.

- Lichen populations and surrounding suitable habitat would be fenced and flagged using infrared tape with a 10-foot buffer to prevent inadvertent trampling of lichen mats.
- Monitoring would be conducted immediately before and after the first cycle of MEU operations to ensure no effect.
- If populations were unaffected after the first MEU cycle, annual population monitoring would continue as scheduled.
- In the event that monitoring shows an expansion of cover, the fenced area should be expanded accordingly.

Summary Table

Table D-16. Summary Effects Determination for Perforate Lichen

<table>
<tr><th rowspan="2">Training Activity</th><th colspan="2">Element</th></tr>
<tr><th>Amphibious Landing</th><th>Ground Movement</th></tr>
<tr><td>Insertion of Forward Command Element</td><td colspan="2" rowspan="2">NE</td></tr>
<tr><td>Insertion of R&S Teams</td></tr>
<tr><td>Helicopter Raid</td><td colspan="2">N/A</td></tr>
<tr><td>Small Boat Raid</td><td rowspan="3">NE</td><td rowspan="3">NLAA</td></tr>
<tr><td>Amphibious Landing Rehearsal</td></tr>
<tr><td>Mechanized Raid Wet</td></tr>
<tr><td>Mechanized Raid Dry</td><td colspan="2">N/A</td></tr>
<tr><td>MEU Landing</td><td>NE</td><td>NLAA</td></tr>
<tr><td>Major Highway Crossing</td><td colspan="2" rowspan="3">N/A</td></tr>
<tr><td>SACEX</td></tr>
<tr><td>Live Fire and/or Maneuver</td></tr>
<tr><td>Direct Action</td><td rowspan="4">NE</td><td>NLAA</td></tr>
<tr><td rowspan="2">Non-Combatant Evacuation Operation</td><td>NE</td></tr>
<tr><td rowspan="2">NLAA</td></tr>
<tr><td>Withdrawal</td></tr>
</table>

NE = No Effect; NLAA = Not Likely to Adversely Affect; N/A = Not Applicable

6. Summary of Determinations

Table D-17 (next page) provides a summary of the impact determinations for each of the Eglin Mainland Reservation T&E species, based on the previous analyses.

7. Conclusion

Overall, ARG/MEU activities would either not likely adversely affect or have no effect on threatened and endangered species populations on Eglin (with the exception of sea turtles on SRI and impacts to the flatwoods salamander associated with potential road improvements) provided avoidance and minimization procedure are adhered to.

Adverse impacts to sea turtles would be associated with nighttime amphibious landing activities and ground movements of vehicles and troops during nesting season. Impacts would mainly be in the form of nesting deterrence from noise and commotion. Calculations of nightly nesting rates reveal that during peak nesting season, an estimated 1.8 loggerhead and 0.13 green turtle nesting emergences could occur within the Proposed Action area over a 10-day period. Direct physical impact to adults, hatchlings, and/or nests is unlikely, as nests would be well marked and surveyors would be present on the beach to alert ARG/MEU personnel to the presence of any turtles. Based on turtle nesting data for the last 13 years (Figure D-3), approximately 20 nests could occur within the action area on SRI during an average green and loggerhead turtle nesting year (8 green, 11 loggerhead, and less than 1 leatherback). If all occurred within the 10-day time period of the ARG/MEU training exercise, all may potentially need to be relocated. Although an avoidance and minimization procedure, the need to relocate nests would be impactive to sea turtle eggs, potentially affecting egg viability and possibly resulting in mortality during relocation. Whenever possible, nests would be left in situ; however, nest relocations would be conducted in accordance with FWC Marine Turtle Conservation Guidelines (1996) and all nests would be monitored daily by permitted surveyors.

Adverse impacts to the flatwoods salamander would be associated with potential loss of known habitat due to construction of a tank trail along a portion of RR 259 between Highway 98 and RR 668. Construction on the east side of the road would be within the primary 538-foot buffer for salamander breeding ponds (the closest pond is approximately 423 feet away from RR 259 on the east side). Most of the 15-foot swath east of RR 259 (width required for tank trail) is already cleared road shoulder, but approximately 7,920 square feet of poor-to-moderate quality buffer habitat and 10,560 square feet of good quality buffer habitat would need to be cleared for the tank trail. Potential impacts include loss of habitat due to sedimentation of wetlands and changes in hydrology associated with trail construction and maintenance. Additionally, mounding of dirt could prevent transit across the trail between ponds. As stated previously, exact details of potential road improvements have not been finalized at this time. Construction of the tank trail would not necessarily result in mortality; however, these situations could result in loss of habitat and adverse affects to breeding, thereby affecting the population in general.

The U.S. Fish and Wildlife Service would be notified immediately if any of the actions considered in this biological assessment are modified or if additional information on listed species becomes available. Based on the finding that the Proposed Action is likely to adversely affect sea turtles and flatwoods salamanders, Eglin AFB requests initiation of formal consultation with the U.S. Fish and Wildlife Service in accordance with the Endangered Species Act.

Table D-17. Cumulative Summary Effect Determination

<table>
<tr><th rowspan="2">Training Activity</th><th colspan="9">Species</th></tr>
<tr><th>RCW</th><th>Sea Turtles</th><th>Flatwoods Salamander</th><th>Bald Eagle</th><th>Okaloosa Darter</th><th>Gulf Sturgeon</th><th>Indigo Snake</th><th>Piping Plover</th><th>Perforate Reindeer Lichen</th></tr>
<tr><td>Insertion of Forward Command Element</td><td rowspan="7">NE</td><td>NLAA</td><td rowspan="2">NLAA</td><td rowspan="14">NE</td><td>NE</td><td rowspan="14">NE</td><td rowspan="14">NLAA</td><td rowspan="9">NLAA</td><td>NE</td></tr>
<tr><td>Insertion of R&S Teams</td><td>LAA</td><td>NLAA</td><td>NLAA</td></tr>
<tr><td>Helicopter Raid</td><td>NE</td><td rowspan="2">NE</td><td rowspan="5">NE</td><td rowspan="2">NE</td></tr>
<tr><td>Rapid Ground Refueling</td><td>NE</td></tr>
<tr><td>Small Boat Raid</td><td rowspan="3">LAA</td><td>NLAA</td><td rowspan="3">NLAA</td></tr>
<tr><td>Amphibious Landing Rehearsal</td><td>NE</td></tr>
<tr><td>Mechanized Raid Wet</td><td rowspan="2">NLAA</td></tr>
<tr><td>Mechanized Raid Dry</td><td rowspan="4">NLAA</td><td>NE</td><td rowspan="4">NLAA</td><td>NE</td></tr>
<tr><td>MEU Landing</td><td>LAA</td><td>LAA
(Tank Trail)</td><td>NLAA</td></tr>
<tr><td>SACEX</td><td rowspan="2">NE</td><td rowspan="4">NE</td><td rowspan="2">NE</td><td rowspan="2">NE</td></tr>
<tr><td>Live Fire and/or Maneuver</td></tr>
<tr><td>Direct Action</td><td rowspan="2">NE</td><td>NLAA</td><td rowspan="2">NE</td><td>NLAA</td><td>NLAA</td></tr>
<tr><td>Non-Combatant Evacuation Operation</td><td>NE</td><td>NE</td><td>NE</td></tr>
<tr><td>Withdrawal</td><td>NLAA</td><td>LAA</td><td>LAA
(Tank Trail)</td><td>NLAA</td><td>NLAA</td><td>NLAA</td></tr>
</table>

NE = No Effect
NLAA= Not Likely to Adversely Affect
LAA = Likely to Adversely Affect

8. Review of Literature and Other Information

All pertinent literature was reviewed. The following summary indicates the primary references utilized during preparation of this assessment.

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U.S. FISH AND WILDLIFE SERVICE

FORMAL CONSULTATION REGARDING
IMPACTS TO

FEDERALLY LISTED THREATENED AND ENDANGERED SPECIES

RESULTING FROM
Amphibious Ready Group/Marine Expeditionary Unit Readiness Training
at Eglin Air Force Base, Florida

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APPENDIX E

SENSITIVE SPECIES AND HABITAT DESCRIPTIONS

SENSITIVE SPECIES AND HABITAT DESCRIPTIONS

The following table shows the federally listed threatened and endangered (T&E) species occurring on the Eglin Military Complex (the Eglin Mainland Reservation, Santa Rosa/Okaloosa Island, and the Gulf of Mexico) that are pertinent to the environmental analysis in this document.

Table E-1. Endangered, Threatened, and Rare Flora and Fauna, January 2002 Eglin Air Force Base, Florida.

SCIENTIFIC NAME	COMMON NAME	STATUS
FISHES		
Acipenser oxyrinchus desotoi	Gulf Sturgeon	FT, SSC
Etheostoma okaloosae	Okaloosa Darter	FE, SE, CT
Pteronotropis welaka	Bluenose Shiner	SSC
AMPHIBIANS		
Ambystoma cingulatum	Flatwoods Salamander	FT, SSCC, CT
Hyla andersonii	Pine Barrens Treefrog	SSC
Rana capito	Gopher Frog	SSC,
Rana okaloosae	Florida Bog Frog	SSC, CT
REPTILES		
Alligator mississippiensis	American Alligator	FT(S/A), SSC
Caretta caretta	Loggerhead	FT, ST
Chelonia mydas	Green Turtle	FE, SE
Dermochelys coriacea	Leatherback	FE, SE
Drymarchon corais couperi	Eastern Indigo Snake	FT, ST
Gopherus polyphemus	Gopher Tortoise	SSC, CT
Macroclemys temminckii	Alligator Snapping Turtle	SSC
Pituophis melanoleucus mugitus	Florida Pine Snake	SSC
BIRDS		
Athene cunicularia floridana	Florida Burrowing Owl	SSC
Charadrius alexandrinus	Snowy Plover	ST, C
Charadrius melodus	Piping Plover	FT, ST
Egretta caerulea	Little blue heron	SSC
Egretta thula	Snowy egret	SSC
Egretta tricolor	Tricolor heron	SSC
Eudocimus albus	White ibis	SSC
Falco sparverius paulus	Southeastern American Kestrel	ST
Haliaeetus leucocephalus	Bald Eagle	FT, ST
Picoides borealis	Red-cockaded Woodpecker	FE, ST, CT
Rynchops niger	Black Skimmer	SSC
Sterna antillarum	Least Tern	ST
MAMMALS		
Peromyscus polionotus leucocephalus	Santa Rosa Beach Mouse	CT
Sciurus niger shermani	Sherman's Fox Squirrel	SSC
Trichechus manatus	West Indian manatee	FE, SE
Tursiops truncatus	Atlantic bottlenose dolphin	MMPA
Ursus americanus floridanus	Florida Black Bear	ST, CT
PLANTS		
Cladonia perforata	Florida perforate lichen	FE, SE, CT

FE = Federally endangered, FT = Federally threatened, FT(S/A) = Federally threatened due to similarity of appearance with another species, C = federal candidate, MMPA = Marine Mammal Protection Act, CT = Eglin/FNAI conservation target, SE = State endangered, ST = State threatened, SSC = State species of special concern, SSCC = State species of special concern candidate.

Critical habitat has been designated for the piping plover on Santa Rosa Island (SRI). The Red-cockaded Woodpecker (RCW) population of Eglin Air Force Base (AFB) has been identified as a recovery population. The Natural Resources Management Branch's (AAC/EMSN) management of Gulf of Mexico resources focuses on mitigating impacts to marine resources from testing and training operations in airspace over the Gulf. Habitat conservation of marine ecosystems and single species management are not the goals of marine resources management on Eglin AFB. AAC/EMSN's marine resources management activities involve consolidating existing marine resource information and fulfilling the need for surveying and updating resource information.

The following species descriptions (excluding marine mammals) are adapted from the U.S. Fish and Wildlife Service (USFWS) threatened and endangered species home page species accounts and information acquired from the Florida Fish and Wildlife Conservation Commission (FWC) website.

Gulf Sturgeon (*Acipenser oxyrhynchyus desotoi*)

The USFWS and National Marine Fisheries Service (NMFS) designated the Gulf sturgeon (*Acipenser oxyrhynchus desotoi)* as threatened under the Endangered Species Act (ESA); listing became official on 30 September 1991. A special rule is in place to allow the taking of Gulf sturgeon for educational and scientific purposes, propagation or survival of the fish, zoological exhibition, and other conservation purposes consistent with the ESA (USFWS and Gulf States Marine Fisheries Commission, 1995).

The Gulf sturgeon migrates from salt water into large coastal rivers to spawn and spend the warm months (Wordsworth Dictionary of Science and Technology, 1995). It lives predominately in the northeastern Gulf of Mexico, where it ranges from the Mississippi Delta east to the Suwannee River in Florida. However, it can be found in the bays and estuaries throughout this range. The species is almost depleted throughout most of its range (U.S. Coast Guard, 1996). Spawning takes place in fresh water, such as the Yellow River, which borders Eglin AFB along the northwest, during April through June (Paruka, 1996). Little is known about the offshore distance the Gulf sturgeon travels, but analyses of stomach contents suggest that feeding occurs as far as 20 miles offshore (Page and Burr, 1991; U.S. Coast Guard, 1996). The biggest threats to Gulf sturgeon populations are oil exploration activities, shrimp trawls, dams, and waste disposal (Wooley and Crateau, 1985; MMS, 1990; Paruka, 1996).

Eglin AFB Conservation Measures

AAC/EMSN does not conduct any active management for Gulf sturgeon at the present time. Passive management consists of erosion control to reduce sedimentation into the Yellow River system from Eglin's extensive network of dirt roads. The AAC/EMSN also assesses potential impacts to Gulf sturgeon from proposed mission activity and recommends conservation measures to avoid impacts to Gulf sturgeon. The AAC/EMSN assists the USFWS with annual sturgeon monitoring in the surrounding Eglin waters. Through the Gulf Coastal Plain Ecosystem Partnership (GCPEP), Eglin contributes to the monitoring of this species, but the Florida Department of Environmental Protection (FDEP) Aquatic Preserves program leads the monitoring of this species in the panhandle.

Okaloosa Darter (*Etheostoma okaloosae*)

The Okaloosa darter, first listed as endangered in the Federal Register, 4 June 1973, is found in six small Choctawhatchee Bay Basin tributaries located in the Sandhills ecological association of the Eglin Mainland Reservation. The darter's diet consists primarily of immature aquatic insect larvae. Spawning occurs from March to October, with the greatest amount of activity taking place during April. The spawning occurs in beds of clean, current-swept macrophytes (large aquatic plants). Each spawning act results in the release of a single egg. Darters do not provide parental care. Little is known of the development of the darter afterwards.

Okaloosa darter habitat is sensitive to a variety of disturbances. Erosion can increase siltation and imperil the darter's habitat. Its range has also been reduced by habitat modification and encroachment by the brown darter. Delisting the darter is not likely in the near future due to the extremely limited range of the darter and its vulnerability to habitat alteration and catastrophic events. In order to protect the Okaloosa darter, the quantity and quality of water in the streams must be protected. Principal factors in the initial listing of the darter were the amount of its habitat degraded by road and dam construction, as well as siltation from land clearing (USFWS, 1998).

Eglin AFB Conservation Measures

In 1981 the USFWS, in cooperation with AAC/EMSN, developed the first Okaloosa darter Recovery Plan. This plan was later revised in 1998. One objective in the Recovery Plan is to improve riparian habitat by reducing sedimentation through closure and rehabilitation of inactive borrow pits and nonpoint source pollution sites such as roadways or right of ways. The goals of this effort are to: (1) stabilize and increase the Okaloosa darter population, (2) significantly reduce erosion from degrading Okaloosa darter habitat, and (3) identify and modify road culverts that have resulted in stream gradients detrimental to Okaloosa darters. AAC/EMSN identified 37 borrow pits and 235 nonpoint source pollution sites totaling 528 acres, with soil loss estimated at 66,000 tons per year that impacted Okaloosa darter watersheds.

Eglin AFB Environmental Management in 1992 contacted the U.S. Army Corps of Engineers (USACE) and the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) to competitively design and contract conservation measures on Okaloosa darter streams. Watershed rehabilitation to date has reduced 52,080 tons/acre of soil loss (78 percent reduction) on Okaloosa darter erosion sites. From 1994 to 2000, a total of 37 borrow pits and 156 nonpoint source sites totaling 339 acres have been rehabilitated and maintained for a total cost of $6,134,404.

In addition to the erosion-control measures described above, the AAC/EMSN initiated an Okaloosa darter monitoring program in 1995 that has been conducted annually by the U.S. Geological Services Caribbean Science Center and Loyola University, Louisiana. The number of monitoring sites has increased over time from 12 to 20 sites. Initially, monitoring was conducted twice during the year in the spring and late summer. Monitoring is now conducted only in the late summer. The darter population appears to be stable or increasing at most sites from 1995 to 2001 and is composed of more than two age classes. Sites that have low or decreasing numbers of darters have identified threats that can be alleviated (i.e., impoundment,

sedimentation, and golf course runoff). If these situations improve and no new problems arise, the darter will be a candidate for downlisting.

Flatwoods Salamander (*Ambystoma cingulatum*)

The flatwoods salamander, listed as threatened in the Federal Register on 1 April 1999, is a small mole salamander about 13 centimeters (cm) (approximately 5 inches) in length when fully mature (Federal Register, 1999). Habitat for the flatwoods salamander consists mainly of open, mesic (moderate moisture) woodland of longleaf/slash pine flatwoods maintained by frequent fires. The ground cover of this habitat supports a rich herbivorous invertebrate community that serves as a food source for the flatwoods salamander.

Adult flatwoods salamanders breed during the rainy season from October to December (Palis, 1997). Their breeding sites are isolated flatwoods depressions that dry completely on a cyclic basis and are generally shallow and relatively small. Known locations of flatwoods salamander breeding sites are shown in Figure A-34 of Appendix A.

The isolated nature of flatwoods salamander populations makes them vulnerable to extirpation. The species must maintain moist skin for respiration and osmoregulation (to control the amounts of water and salts in their bodies) (Federal Register, 1999). Consequently, since they may disperse long distances to upland sites where they live as adults, desiccation (drying out) can be a limiting factor in their movements. As a result, it is important that areas connecting their wetland and terrestrial habitats are protected in order to provide cover and appropriate moisture regimes during their migration. Land uses that have a dramatic adverse impact on flatwoods salamander habitat can present significant threats to the existence of the species as well. The manner, timing, and extent of silviculture activities all dictate what effects they may have on the flatwoods salamander and its habitat. Random catastrophic events can also have a devastating effect on the salamander habitats (Federal Register, 1999).

Eglin AFB Conservation Measures

The majority of Eglin's flatwoods salamander habitat is in fair-to-moderate condition and has received some fire within the last five years. However there are many locations, especially in urban interface areas, that lack good firebreaks, are severely fire suppressed, and require reintroduction of prescribed fire. Future management of Eglin's flatwoods salamander population will consist of establishing firebreaks along parts of the Eglin urban interface property boundary to facilitate the reintroduction of prescribed fire and continued efforts to survey and monitor the population. In addition, the AAC/EMSN has prioritized the treatment of invasive exotic species within and adjacent to flatwoods salamander habitat.

Eastern Indigo Snake (*Drymarchon corais couperi*)

The eastern indigo snake is the largest nonvenomous snake in North America and can grow up to 125 inches in length. The snake is a meat-eater (carnivorous) and will eat any animal up to about the size of a squirrel. The snake frequents flatwoods, hammocks, stream bottoms, canebrakes, riparian thickets, and high ground with deep, well drained to excessively drained, sandy soils.

Habitat preferences vary seasonally. Xeric Sandhill winter dens are used from December to April; from May to July they shift from winter dens to summer territories; from August through November they are frequently located in shady creek bottoms. These seasonal changes in habitat encourage the maintenance of travel corridors that link these different habitat types. The summer home range for a single male has been reported to be as large as 470 acres.

The federally threatened eastern indigo snake is strongly associated with gopher tortoise burrows. In Georgia, 92 percent of the indigo snakes identified during the study were located in gopher tortoise burrows (Diemer and Speake, 1983). They use abandoned burrows in winter and spring for egg laying, shedding, and protection from dehydration and temperature extremes. Indigo snakes are even known to use tortoise burrows with collapsed entrances by creating a small entrance. They also use stump holes, armadillo and gopher holes, and other wildlife ground cavities.

The primary reason for its listing as federally threatened is population declines resulting from habitat loss and fragmentation (Moler, 1987). Movement along travel corridors between seasonal habitats also exposes the snake to danger from increased contact with humans. From 1978 to 1999, Jackson Guard reported the sighting of 18 indigo snakes throughout the Eglin Mainland Reservation, based on Florida Natural Areas Inventory (FNAI) element occurrences and incidental sightings (U.S. Air Force, 2000). Many of these snakes were seen crossing roads or after being killed by vehicles.

Eglin AFB Conservation Measures

The AAC/EMSN primarily conducts passive management for the indigo snake by maintaining suitable habitat conditions. This includes the frequent use of fire over large portions of Eglin's sandhills. The closure of forest roads and the use of perimeter access control also benefit indigo snakes by reducing the frequency of accidental motor vehicle and indigo snake contacts. Additionally, the management and recovery of the eastern indigo snake is closely linked to the gopher tortoise. Management activities that benefit gopher tortoises benefit the indigo snake as well.

Sea Turtles

Of the five species of marine turtles found in the Gulf of Mexico, two species are known to nest on SRI beaches. These species are the Atlantic green turtle and the Atlantic loggerhead turtle. However, the majority of nests on SRI are from loggerhead sea turtles. The highest density of loggerhead nesting in the Florida panhandle occurs on Cape San Blas. Until the spring of 2000, the only confirmed leatherback nestings in northwest Florida were in Franklin and Gulf counties. In June 2000, a leatherback nesting activity was documented for the first time in Okaloosa County, on Eglin's portion of Okaloosa Island (Miller, personal communication, 2000). No green turtle or leatherback nests have been documented on Eglin AFB Cape San Blas beaches (Meylan et al., 1995; FWC Florida Marine Research Institute (FMRI), 1996, 1997, 1998; U.S. Air Force, 1998). The USFWS oversees the sea turtle protection and conservation of habitat on land, while the NMFS oversees its protection in marine waters. Most sea turtles nest on beaches in northwest Florida from mid-May through the end of August.

Eglin's management of sea turtles is conducted through monitoring by surveys 7 days a week from 15 May to 31 October. Nearly 4.8 kilometers (3.0 miles) of Cape San Blas are surveyed (initiated before sunrise) by walking or driving all-terrain vehicles (ATVs). Turtle crawls are identified as either a true nesting crawl or false crawl (no nesting activity associated with the crawl). The sea turtle nests are marked with stakes and surrounded with surveyor flagging tape. Nests are then monitored throughout the entire incubation period for potential storm damage, hatching activity, and predation. Nests are only relocated if threatened by erosion, inundation, or predation.

Aerial surveys of Atlantic loggerhead turtles have indicated that they are most common in waters less than 50 meters deep. Aerial surveys indicate that there are fewer numbers of turtles visible in shallow waters during the winter months than in the summer months. During the warmer months, the turtles spend more time at the water surface. During 1987, a survey of the maximum densities of sea turtles east of the Mississippi River to Perdido Bay, Alabama, resulted in an estimate of 0.3 sea turtles per 100 square kilometers (km^2). Estimates of sea turtle densities east of the Mississippi River from June 1988 to June 1990 ranged from 0.92 (winter) to 4.83 (spring) turtles per 100 km^2 (U.S. Air Force, 1999).

Atlantic Loggerhead Sea Turtle (Caretta caretta)

The loggerhead sea turtle (*Caretta caretta*) was federally listed as threatened on 28 July 1978 (43 FR 32800). This species inhabits the continental shelves and estuarine environments along the margins of the Atlantic, Pacific, and Indian oceans. Loggerhead sea turtles nest within the continental United States from Louisiana to Virginia (NMFS and USFWS, 1991). Critical habitat has not been designated for loggerhead turtles along the Gulf coast of Florida.

Nesting females approach SRI in the spring and summer to dig their nests between the high tide mark and the dune line and sometimes between dunes. Surveys of both the green and loggerhead turtle nests on SRI report that the earliest nests were most often observed during the last week in May and the latest nests during the first week of August (Lamont et al., 1998).

Atlantic Green Sea Turtle (Chelonia mydas)

Federally listed as endangered on 28 July 1978 (43 FR 32808), the green sea turtle (*Chelonia mydas*) has a breeding population in Florida and along the Pacific Coast of Mexico that is listed as endangered; all other populations are listed as threatened. The east coast of Florida supports relatively larger numbers of green sea turtles. Nesting activity has also been documented along the Florida Gulf coasts (Meylan et al., 1995). There has been no designation of critical habitat for green turtles along Florida's Gulf coast.

Green turtle nesting occurs along most northwest Florida beaches, except for Franklin and Bay counties. The nesting and hatching season for the green sea turtle extends from 1 May through 31 October in Florida's panhandle. Nesting in the panhandle, however, has been consistently documented as an every-other-year event since 1990, with incubation periods ranging from 60 to 90 days.

Leatherback Sea Turtle (Dermochelys coriacea)

The leatherback sea turtle (*Dermochelys coriacea*) was federally listed as an endangered species on 2 June 1970 (35 FR 8495). This species commonly nests along the shorelines of the Atlantic, Pacific, and Indian Oceans. Mexico's western shoreline supports the world's largest concentration of nesting leatherbacks (NMFS and USFWS, 1992; National Research Council, 1990). Only infrequent nesting activity has been documented for the leatherback in northwest Florida (LeBuff, 1976; FWC FMRI, unpubl. data; Longieliere et al., 1997). During the 2000 nesting season, three leatherback nests were identified on SRI, the first known occurrence of leatherback nesting on Eglin AFB.

Critical habitat has not been designated for leatherback turtles along the Gulf coast of Florida. The nesting and hatching season for the leatherback extends from 1 May through 30 September, with nest incubation ranging from 60 to 75 days (FWC FMRI unpublished data; Longieliere et al., 1997; FWC FMRI, 1998).

Eglin AFB Conservation Measures

The main role the AAC/EMSN plays in the management and conservation of sea turtles is to locate, mark, and protect sea turtle nests; assess potential impacts to sea turtles from proposed mission activity; and recommend conservation measures to avoid impacts to nesting sea turtles, their nests, and emerging hatchlings. Mission impacts to sea turtles in the Gulf of Mexico are also assessed. Eglin's beaches are surveyed daily, seven days a week from mid-May to the end of August, to locate crawls of nesting female sea turtles, determine the species of turtle by examining crawl characteristics, determine whether the crawl is a nesting crawl or a false crawl, place protective screening over the nest to deter predators, and mark the nest location.

In 2001, the AAC/EMSN received funding to convert or replace the remaining lights on Air Force property on Santa Rosa and Okaloosa Island to low-pressure sodium vapor, a measure that reduces the potential for hatchling disorientation caused by Air Force lighting. The AAC/EMSN has also participated in the USFWS/(USDA) Endangered Species Protection program funded by the USDA Wildlife Services Branch to conduct predator control on the Santa Rosa and Okaloosa Islands and Cape San Blas. These efforts significantly reduced the depredation of sea turtle nests by coyotes. The AAC/EMSN also participates in Florida's sea turtle stranding and salvage program. Ongoing research for sea turtles includes continued monitoring of protected species, study of sea turtle internesting behavior using sonic and radio telemetry, and an investigation of near-shore underwater topography.

Piping Plover (*Charadrius melodus*)

The piping plover *(Charadrius melodus*) was federally listed as an endangered species in the Great Lakes watershed and as a threatened species elsewhere in its range on 10 January 1986. The birds' primary winter range is along the Atlantic and Gulf coasts from North Carolina to Mexico and into the Bahamas and West Indies (USFWS, 1988, 1989, and 1989a as cited in USFWS, 1996). Critical habitat has been designated for piping plovers along areas of the Gulf coast of Florida.

Piping plovers are commonly found to spend winters in the eastern portion of the Florida panhandle (Franklin through Bay counties). Even though Florida has not been considered a primary wintering area for piping plover, diminishing habitat along other Gulf coast areas may be affording the piping plover new wintering grounds in Florida. These wintering grounds are still considered less suitable, thus forcing the piping plover to utilize isolated patches. The 1996 International Piping Plover Census was conducted along the Gulf coast (Florida to Texas) and identified 344 birds (approximately 16 percent) in Florida.

The Florida panhandle also accounted for 46.0 percent of piping plovers observed during the statewide 1993-94 winter survey. During this survey, piping plovers were observed at 10 sites, and Cape San Blas was one of these sites (Sprandel et al., 1997).

Piping Plover Critical Habitat

Critical habitat designation for wintering and breeding grounds for the piping plover was published in the Federal Register on 10 July 2001. Critical habitat is a term defined in the Endangered Species Act that refers to specific geographic areas that contain the essential habitat features necessary for the conservation of threatened and/or endangered species. At the time of designation, the critical habitat areas do not necessarily have to be occupied by piping plovers. Critical habitat areas may require special protection or management considerations for current populations as well as potential population increases necessary to achieve species recovery.

Federal agencies are therefore required to review activities they fund, authorize, or carry out to assess potential impacts of their actions on designated critical habitat. The USFWS has identified several activities that may potentially have adverse impacts on piping plover critical habitat. Such activities may include:

- Dredging and dredge spoil placement
- Seismic exploration
- Construction and installation of facilities, pipelines, and roads associated with oil and gas development, oil spills and oil spill cleanup
- Construction of dwellings, roads, marinas, and other structures
- Staging of equipment and materials
- Beach nourishment, stabilizations, and cleaning
- All-terrain vehicular activity
- Storm water and wastewater discharge
- Sale, exchange, or lease of federal land that contains suitable habitat that is likely to result in the habitat being degraded
- Marsh restoration
- Military maneuvers

Piping plovers winter in coastal areas of the United States from North Carolina to Texas. Observation data for piping plovers indicate that the winter range of the three breeding populations may overlap and therefore, field determinations of the source breeding populations for wintering individuals cannot be accurately made. Wintering piping plovers may arrive as early as July and continue through September, with some individuals remaining year round. Piping plovers are believed to migrate non-stop to wintering grounds, although migration is not fully understood. Piping plovers utilize the intertidal mud and sand flats of the beach areas in search of prey items such as marine worms, crustaceans, insects, and clams.

Portions of SRI have been identified as units or parcels of land in Florida containing designated critical habitat for wintering piping plovers (Figure A-35, Appendix A). Critical habitat on Eglin property would potentially affect only beach access and use within those areas utilized by humans during authorized federal activities that may preclude successful piping plover wintering activities. The USFWS is committed to working with federal agencies to provide methods of protection for the wintering and breeding sites while minimizing restricted access and use of the areas designated. Human disturbance is considered less of an issue in wintering areas, as piping plovers are not necessarily tied to specific beach sites even though they may return to the same beach for wintering each year. Human disturbance to areas designated as piping plover breeding sites are considered more sensitive. As such, few restrictions on human access and beach use are anticipated for the designated piping plover wintering areas.

Eglin AFB Conservation Measures

Eglin's management for the piping plover consists of maintaining suitable habitat for the species. The impacts of outdoor recreational use of SRI is an area of concern that is currently being addressed. AAC/EMSN will continue to conduct annual plover surveys in critical habitat areas of SRI in conjunction with other shorebird surveys. The AAC/EMSN and members from the Choctawhatchee Audubon Society will continue to conduct piping plover surveys along Santa Rosa Sound to record numbers of wintering piping plovers utilizing Eglin AFB property.

Bald Eagle (*Haliaeetus leucocephalus*)

The bald eagle *(Haliaeetus leucocephalus)* was initially considered to have two distinct subspecies when the southern bald eagle was listed as an endangered species on 11 March 1967. The entire species was listed as endangered in 43 of the conterminous 48 states and threatened in the remaining five states (Michigan, Minnesota, Oregon, Washington, and Wisconsin) on 14 February 1978. Declines in bald eagle populations began after WWII and have been attributed to the widespread use of the pesticide DDT from the post-WWII era to the early 1970s. This pesticide inhibited the nesting females' ability to metabolize calcium necessary for eggshell development, resulting in widespread nest failures for several decades.

Bald eagles have made an impressive comeback since the banning of DDT in the early 1970s, and on 11 August 1995, the bald eagle was officially downlisted from endangered to threatened in the lower 48 states. This comeback is particularly noticeable in northwest Florida, where eagle nests have increased from approximately 500 to 600 nests in the mid-1980s to more than 1,000 nests in the 1998-1999 nesting season (Gore, personal communication, 1999).

In 1963, the National Audubon Society surveyed the lower 48 states and located only 417 active bald eagle nests. By 1994, 4,452 occupied territories were identified, an increase of 462 percent. An occupied territory is an area occupied by a pair of adult bald eagles. In the Southeastern Recovery Region (Texas, Louisiana, Mississippi, Alabama, Florida, Arkansas, Tennessee, Kentucky, Georgia, South Carolina, and North Carolina), 1,243 occupied territories were identified in 1996, with Florida having 879 of those territories (Millar, 1996). The Florida panhandle had 59 active nests in the 1997-98 nesting season (FWC, 1998).

Bald eagles nest when they reach 4 years of age. They are territorial and exhibit a strong affinity for a nest site once a nest has been established. It is common for a breeding pair to rebuild damaged or lost nests in the same tree or in an adjacent tree. The nesting period in the southeast United States extends from 1 October to 15 May, with most nests being completed by the end of November. Individual pairs return to the same territory year after year and territories are often inherited by subsequent generations.

Eagles typically lay between one and three eggs with an incubation period of 34 to 36 days. In northwest Florida, most successful nests are laid by mid-February. A nesting pair typically produces one to three fledglings, but usually only one fledgling survives. The quality and amount of forage resources heavily influence fledgling survival. The fledging period has been documented to last from 70 to 98 days. Eagles forage on fish and on carrion.

Eglin AFB Conservation Measures

The USFWS has established guidelines for the protection of bald eagles in *Habitat Management Guidelines for the Bald Eagle in the Southeast Region.* These guidelines are based on the use of a primary and a secondary protection zone. The primary zone extends from the nest to a radius of 750 feet, while the secondary zone extends to a radius of 1 mile from the nest. Certain activities are prohibited year-round and during the nesting season within these zones. Most activities are restricted within the primary zone during the nesting season. The AAC/EMSN utilizes volunteers from the Choctawhatchee Audubon Society to help annually monitor bald eagle nesting success on the Eglin reservation.

Red-cockaded Woodpecker (RCW) (*Picoides borealis*)

The RCW primarily inhabits the interstitial areas of the Eglin reservation (see Figure A-34 of Appendix A). On Eglin, the RCW typically inhabits mature, open stands of longleaf pine. The RCW does not migrate and maintains year-round territories near nesting and roosting trees (Hooper et al., 1980). Studies by DeLotelle et al. (1987) in central Florida found that RCWs foraged primarily in longleaf pine and pond cypress stands with dense ground cover of broomsedge bluestem (*Andropogon virginicus*). The birds will abandon nest cavities when the understory reaches the height of the cavity entrance.

An RCW cluster typically encompasses about 10 acres with most cavity trees most likely within a 1,500-foot diameter circle. The RCW has shown some preference for mature longleaf pine over other pine species as a cavity tree with the average age of longleaf pines in which new cavities have been excavated being 95 years. Cavity excavation may take several years and may be utilized by generations of birds for more than 50 years (Jackson et al., 1979).

The woodpeckers primarily feed on spiders, ants, cockroaches, centipedes, and insect eggs and larvae that are excavated from trees. Dead, dying, and lightning-damaged trees that are infested with insects are a preferred feeding source. The birds also feed on the fruits of black cherry (*Prunus serotina*), southern bayberry (*Myrica cerifera*), and black tupelo (*Nyssa sylvatica*) (Baker, 1974).

High-quality RCW forage habitat consists of open pine stands with tree dbh (diameter at breast height) averaging 9 inches and larger. The birds forage in intermediate-aged (30-year-old) and older pine stands, which also provide an important source of future trees for the construction of cavities (U.S. Air Force, 1996). While 100 acres of mature pine is sufficient for some groups, clans commonly forage over several hundred acres where habitat conditions are not ideal (Jackson et al., 1979). The greatest threat to the RCW populations is loss and fragmentation of their habitat. As a result of active management, RCW populations on Eglin have continued to increase, with the number of active clusters growing from an estimated 217 in 1994 to 308 in 2001 (Moranz and Hardesty, 1998; Petrick, 2001).

Eglin AFB Conservation Measures

Eglin's RCW population is considered to be fastest growing large population in the country. The USFWS has identified Eglin AFB in the RCW Recovery Plan as 1 of 13 designated primary core populations. The recovery goal for these 13 populations is to reach 350 potential breeding pairs or 500 active clusters. Long-term RCW goals and objectives involve the restoration of sandhill and flatwoods habitat outside of the two recognized RCW subpopulations (where suitable old growth longleaf pine is present) to expand Eglin's RCW population and reduce the conservation significance of individual RCW clusters adjacent to test and training ranges. Ecosystem management refers to practices that promote longleaf pine ecosystems generally and RCWs specifically. The critical elements are prescribed burning, including some growing season burns, timber management, and ecosystem restoration to include hardwood and sand pine removal. More species-specific management, such as the use of recruitment cluster construction, cavity management, and translocation, are necessary to keep this subpopulation from declining. The creation of recruitment clusters involves drilling four artificial cavities. Cavity management involves checking each active cluster annually and, if necessary, additional cavities are created either by placing restrictors over enlarged cavities or by drilling new artificial cavities. Translocation will be used to move juvenile males and females from the donor site within Eglin's western subpopulation to the eastern subpopulation.

Florida Perforate Lichen (*Cladonia perforata)*

Listed as endangered in the Federal Register, 27 April 1993, this pale, yellowish-gray lichen forms large dense clusters, the branches of which arise from spore-producing structures and not from the vegetative body of the fungus, as is the case with other branched lichens. This lichen occurs at two sites on SRI (Eglin AFB, Okaloosa County) and in scrub vegetation in central Florida south of Lake Placid (Highlands County), at Jonathan Dickinson Park near the southeastern coast in Martin County, and (subject to confirmation) a nearby site in northern Palm Beach County. There is a reasonable possibility that the lichen will be found at widely scattered localities elsewhere in Florida. However, very extensive searches have shown that this is an extremely rare lichen.

There are a total of 12 confirmed sites where this plant can be found. One site had recently been destroyed in Highlands County. There is an estimated total of at least 26,000 individuals: 17,000 on one private site, 3,000 on another private site, 4,400 on Archbold Biological Station, and 1,300 on SRI (USFWS, 2001). In central Florida, this lichen occurs on small hills of excessively drained sand (Archbold series) occupied by Florida rosemary (with an array of smaller endemic vascular plants including *Hypericum cumulicola* and *Eryngium cuneifolium*) and often among a blanket of reindeer lichens (USFWS, 2001). Trampling by recreational users of the beach on SRI may create potential problems for the continued existence of the lichen in the panhandle. As a result, the management of recreational visitors (with boardwalks or other means of directing pedestrian traffic) is important.

Eglin AFB Conservation Measures

In April of 2001, Eglin's Air Armament Center Commander approved the designation of five public beach access sites south of U.S. Highway 98 along Eglin's portion of Okaloosa Island and the use of sand fencing to control pedestrian access. Over 2.5 miles of sand fencing were erected by the AAC/EMSN to prevent pedestrians parking on the southern road shoulder of U.S. Highway 98 from walking through the four-strand wire fence and damaging *Cladonia* and dune systems. This approach seems to be working since there is much less visible foot traffic on the dunes since the fencing was installed. Eglin's AAC/EMSN has also worked to establish two new colonies of the lichen on the restricted portion of SRI as part of recovery efforts. Eglin monitors all *Cladonia* colonies on a regular basis.

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APPENDIX F

ECOLOGICAL ASSOCIATIONS DESCRIPTIONS

ECOLOGICAL ASSOCIATION DESCRIPTIONS

Sandhills Ecological Association

Description

This is the largest ecological association on Eglin Air Force Base (AFB), covering 78 percent of the reservation. The Sandhills vegetative community represents the majority of this association and includes the Sand Pine ecosystem, which covers 3 percent of the reservation, and the Pine/Mixed Hardwood ecosystem, which covers approximately 10,000 acres of the reservation. The Sand Pine ecosystem is the result of the encroachment of sand pine, causing some areas to become a sand pine-dominated forest that varies from predominately natural to substantially modified. This association has the oldest natural sand pine on the Eglin reservation. Eglin's largest area of pine/mixed hardwoods occurs in the northeast portion of the reservation along the eastern slope of Alaqua Creek, from Alice Creek to Sweetwater Branch. Another area of this ecosystem occurs along Blout Creek, near its confluence with Alaqua Creek, north of the preceding site. The majority of the area is open to the public on a limited basis (seasonally or conditionally, depending on mission safety footprints). A small portion is closed year-round to public recreation due to mission safety.

The Sandhills association varies from predominantly natural to substantially modified. The association is characterized by rolling sandhill ridges dissected by streams. Slopes break sharply next to streams but are gradual next to wet, depressional areas. Numerous steepheads are found throughout the association. The underlying geology is variable. Most of the association is between 20 and 295 feet above sea level.

The soils are excessively drained, strongly acidic, brownish-yellow soils, low in natural fertility and organic content. Seventy-eight percent of this association is characterized by soil associations that are formed in thick deposits of sand extending to depths of more than 80 inches. Only 10 percent of the soil associations have loamy subsoils on gently sloping narrow ridges and steep side slopes. These soils are dissected by gray, sandy, poorly drained soils on narrow stream bottoms.

This xeric uplands sandhill association is dominated by an overstory of scattered longleaf pine with an understory of turkey oak, bluejack, sand post oak, and live oak. The ground cover consists of various grasses and herbs including gopher apple, bluestems, panic grasses, pinewoods dropseed, bracken fern, and runner live oak. Rare plant species include southern three-awned grass (*Aristida simpliciflora*), pineland wild indigo (*Baptisia calycosa* var. *villosa*), toothed savory (*Calamintha dentata*), and pineland hoary pea (*Tephrosia mohrii*). Wiregrass does occur in some portions of the sandhills; however, its distribution is limited. Reasons for this are unknown at this time.

Much of this association has been affected by early naval stores, logging, and fire control practices, which severely reduced the pine overstory and led to encroachment by sand pine and various “scrub” oaks. Mechanically established longleaf, slash, and sand pine plantations are found throughout this association.

Small amounts of scrub, xeric hammock, flatwoods, dome swamp, depression marsh, and bottomland forest communities interrupt the sandhill vegetation.

The use of fire as a management tool was very limited, and scrub oak began to take over longleaf sites, shading out ground cover plants. This lack of fire also allowed sand pine to encroach into the longleaf sandhills. According to the 1931 Choctawhatchee National Forest Plan, there were only 7,000 acres of sand pine in the forest. By 1949, there was over 17,000 acres of sand pine on the forest. The 1949 Eglin AFB Management Plan stated: "There are many areas now which have an overstory of longleaf pine, but an understory of sand pine, and which will be converted to the sand pine type when the longleaf pine is cut." Thirty years later, by 1979, there were over 60,000 acres of sand pine on the reservation. To more closely mimic a natural system, growing season prescribed fire began in 1994, as part of the vegetative restoration process.

Present Condition

Approximately 16 percent of the Sandhill community has been substantially modified by heavy site impact reforestation techniques and the planting of slash and sand pine species. Fifty-seven thousand acres, or 16 percent of the community, have been altered to create open test ranges and administrative/residential areas. Almost half of the remaining 245,000 acres of the community remains in a severely cutover condition where scrub oak has become the dominant species.

During the last 10 years, 9,300 acres of naturally seeded longleaf pine have been released from hardwood competition by use of the herbicide "Velpar" with varying results due primarily to variations in application rates and techniques. In many areas that have not been treated with herbicide and have not been exposed to frequent recurring fire, scrub oaks and encroaching sand pine are now of sufficient size and density to affect midstory crown closure and shade out ground cover, including natural longleaf regeneration.

The existing transportation system is extensive within the Sandhill community. A majority of these roads have no clay or other material used for upgrading the surface. Approximately 30 percent of these roads are maintained and have clay surfaces. Poor design and placement of clay surface roads and pits used to obtain clay have caused numerous erosion problems. Clay and sand washing from the roads and pits located adjacent to streams have degraded numerous streams. Management efforts since the late 1970s have stopped the degradation of many streams by redesigning roads and clay removal pits. All clay removal pits have been classified according to the severity of erosion. Roads with special erosion problems have been identified for corrective actions. The Air Force is presently contracting for design and restoration work. It is estimated that less than 1 percent of the Sandhill community is in Tier I, approximately 60 percent is in Tier II, and the remaining 35 to 40 percent is in Tier III and IV.

Wetlands and Riparian Ecological Association

Description

Wetlands and Riparian ecological associations on Eglin AFB can be divided into the following categories: (1) Wetlands which are dominated by plants adapted to anaerobic substrate conditions imposed by saturation or inundation for more than 10 percent of the growing season,

(2) lacustrine wetlands that occur in nonflowing wetlands of natural depressions, and (3) riverine communities, which are natural, flowing waters from their source to the downstream limits of tidal influence and are bounded by channel banks. The above categories are further broken down into natural community types. Acreage for each type has not been identified.

(a) Wet flatlands - flat, poorly drained sand with an underlying layer of peat.

(1) Hydric hammock - These are areas dominated by broadleaved evergreens growing on poorly drained soil only rarely subject to seasonal or periodic flooding. Hammocks of this type occur on Chipley-Foxworth-Albany soils usually with an accumulation of organic matter.

(2) Seepage slope (pitcher plant bog, seep) - Bogs are typically wet grassy areas, usually located on a gradual slope. A few trees and shrubs may be present, but generally such areas are open. Seepage slopes occur sporadically on the reservation, mostly in Walton County. The majority of the bogs are located in the east central portion of the reservation.

(b) Floodplain wetlands - flat, alluvial sand or peat substrates associated with riverine natural communities and subject to flooding but not permanent inundation.

(1) Bottomland forest - Bottomland forest occurs on low-lying flatlands, usually bordering streams with distinct banks, where water rarely inundates the forest, such as areas along the Yellow River. On Eglin, these communities are also found on low terraces along the larger streams, such as Alaqua Creek. Rare plant species include orange azalea (*Rhododendron austrinum*) and Indian cucumber root (*Medeola virginiana*).

(2) Floodplain forest - This term is used to designate river bottoms and low creek bottoms. In swamps with a recent fire history, the common tree is the black titi. Rare plant species include serviceberry holly (*Ilex amelanchier*), Florida anise (*Illicium floridanum*), spoonflower (*Peltandra sagittifolia*), and gulf spikemoss (*Selaginella ludoviciana*).

(c) Basin wetlands - shallow, closed basin with outlet usually only in time of high water; peat or sand substrate, usually inundated; wetland vegetation woody and/or herbaceous.

(1) Depression marsh - These systems are shallow, usually rounded depressions in sand substrate with herbaceous vegetation often in concentric bands. Peaty soil accumulates in the deepest sections where water is most permanent. Other rare plant species include panhandle meadow beauty (*Rhexia salicifolia*), karst pond yellow-eyed grass (*Xyris longisepala*), and water sundew (*Drosera intermedia*).

(2) River floodplain lake - Fresh water ponds support a variety of aquatic vegetation. Not all ponds on the reservation support the same vegetation. Rare plant species include Piedmont water milfoil (*Myriophyllum laxum*).

(3) Sandhills upland lake - Shallow, rounded depressions, sandy bottom, low nutrient. Rare plant species include panhandle meadowbeauty (*Rhexia salicifolia*) and karst pond yellow-eyed grass (*Xyris longisepala*).

(d) Riparian zones may be classified into the following ravine natural community types.

(1) Alluvial stream - Clay and silt carrying, larger streams, perennial (Yellow River). Alluvial streams are characterized as perennial or intermittent seasonal watercourses originating in high uplands that are primarily composed of sandy clays and clayey-silty sands. Surface runoff generally predominates over subsurface drainage. Rare plant species include Piedmont water milfoil (*Myriophyllum lwxum*), West Florida cow lily (*Nuphar lutea ssp. ulvaceum*), Florida pondweed (*Potamogeton floridanus*), and Alabama beakrush (*Rhynchospora crinipes*).

(2) Blackwater stream - Blackwater River, Blackwater Creek. Blackwater streams are characterized as perennial or intermittent seasonal water courses originating deep in sandy lowlands where extensive wetlands with organic soils function as reservoirs, collecting rainfall and discharging it slowly to the stream. The dark, tea-colored water typical of blackwater streams are laden with tannins, particulates, dissolved organic matter, and iron derived from drainage through swamps and marshes. Rare plant species include Piedmont water milfoil (*Myriophyllum laxum*), West Florida cow lily (*Nuphar lutea aap. ulvaceum*), and Florida pondweed (*Potamogeton floridanus*).

(3) Seepage stream - steephead stream, clear brook, swift brook, hammock stream. Seepage streams are characterized as perennial or intermittent seasonal water courses, originating from shallow ground waters that have percolated through deep, sandy, upland soils. These streams are typically clear to lightly colored. They are relatively short, shallow, and narrow.

The majority of the streams located on Eglin AFB are classified as seepage streams. The seepage streams that drain into Rocky and Boggy bayous are inhabited by the Okaloosa darter, a federally endangered fish. Rare plant species in seepage streams include water sundew (*Drosera intermedia*), white-topped pitcher plant (*Sarracenia leucophylla*), sweet pitcher plant (*Sarracenia rubra*), spoon flower (*Peltandra sagittifolia*), and panhandle lily (*Lilium iridollae*).

(4) Spring run stream - Calcareous stream, spring, or creek. These streams originate in deep artesian springs. The only example of a spring-run stream on Eglin is Blue Spring Creek in Okaloosa County. Typical plant species include tap grass, arrowheads, southern naiads, pondweeds, and chara. Rare plant species include water sundew (*Drosera intermedia*) and white-topped pitcher plant (*Sarracenia leucophylla*).

Much of the history of this community is unknown, especially the frequency of fire and its affects on this community. It is speculated that this community, because of the lack of fire, may have facilitated the movement of sand pine from the coast into the interior portions of the Eglin

reservation. Fire of various intensities moved from the sandhills into this community, but probably only cooler, backing fires were able to enter the steeper sloped stream areas.

Present Condition

Wetlands and riparian areas are, for the most part, in a stable condition. Erosion from roads and clay and sand pits has caused some degradation. These problems affect less than 10 percent of the wetlands and riparian areas on Eglin.

Flatwoods Ecological Association

Description

All three flatwoods communities, the Mesic, Wet, and Scrubby Flatwoods are found on the Eglin reservation.

(a) The Mesic Flatwoods is the most widespread and is associated with, and often grades into, Wet Flatwoods or Scrubby Flatwoods. The Mesic Flatwoods is characterized as open canopy forest of widely spaced pine trees with little or no midstory but a dense ground cover of herbs and shrubs. Of the variations of Mesic Flatwoods that are recognized, the Longleaf Pine/Wiregrass association is the most common. Other typical plants include gallberry, saw palmetto, St. John’s wort, and dwarf wax myrtle.

(b) The Wet Flatwoods community can be characterized as having a relatively open canopy of scattered pines with a thick understory and a very sparse ground cover. A small percentage of this community has an open canopy of pines, a sparse understory, and a dense ground cover. Typical plants include slash pine, gallberry, titi, dwarf wax myrtle, and sweetbay. Pond pine and some pitcher plants can be found as part of this community in the eastern portion of the reservation.

(c) The Scrubby Flatwoods can be characterized as having an open canopy of longleaf pine with an understory of scrub oak, saw palmetto, and sparse ground cover. The Scrubby Flatwoods is mainly found in the southwestern portion of the reservation.

The use of fire as a management tool was limited within these communities. Fire has been more prevalent in the Scrubby and Mesic Flatwoods than in the Wet Flatwoods. Prescribed fire has been used more often within these communities since the mid-1970s, but large portions still have had little or no fire for many years. The lack of frequent fire has caused some of the Wet Flatwoods to succeed to a hardwood-dominated forest with a closed canopy that has eliminated ground cover. This lack of fire has also impacted the Mesic Flatwoods due to the encroachment of titi, although a large majority of this community has received some fire in the recent past. Most of the longleaf and slash reproduction in the flatwoods probably occurred before the U.S. Forest Service began its fire control programs. A large portion of the flatwoods on the Yellow and East Rivers continued to be burned until they were purchased by the U.S. Forest Service in the mid-1930s.

Present Condition

All three of these communities are mainly composed of younger, second growth trees. Relict longleaf and slash pine and small stands of old-growth longleaf or slash can be found scattered throughout the communities. The plants within these communities are adapted to fire and several species depend on fire for their continued existence, although fire is severely lacking within these communities and has caused parts of the community to succeed to a hardwood forest association. The effects of recent prescribed fire can be seen in parts of this community. Due to early cutting practices, lack of fire and spotty-to-heavy natural regeneration over a period of years, the communities vary from an open, park-like appearance, to a very dense, almost impenetrable, looking forest. Longleaf is the dominant pine on almost 90 percent of the communities. The communities tend to look one size due to the relatively young and even aged stand structure resulting from the overcutting and lack of fire. It is estimated that less than 1 percent of this association is Tier I, approximately 70 percent is Tier II, and the remaining 25 to 30 percent is Tiers III and IV.

Barrier Island Ecological Association

Description

Eglin's barrier islands include three land tracts in Santa Rosa, Okaloosa, and Gulf counties. The westernmost unit is 13 miles long and is located in Santa Rosa and Okaloosa counties. The central unit is 4 miles long and is located in Okaloosa County. Both units are very narrow in width and share the Gulf of Mexico as their southern boundary. The northern boundary of the western unit is Santa Rosa Sound. The northern boundary for the central unit is Choctawhatchee Bay. The eastern unit, known as Cape San Blas, is omitted from further discussion since it is not part of the Proposed Action. The southern boundary is the Gulf of Mexico. The western portion is predominately natural to slightly modified. The central portion is somewhat less natural due to impacts from public recreation.

Vegetative communities most commonly found on Eglin's barrier islands include beach dunes, coastal strands, scrub, scrubby flatwoods, mesic flatwoods, and saltwater and freshwater marsh. These communities occur on level to strongly sloping land adjacent to the Gulf of Mexico. Plant life has adapted to, and is influenced by, the salty environment. The overstory and understory plant density varies depending on soil stability and exposure to salt spray. Colonizing plant species inhabit the area in and adjacent to the primary dune line and other areas where shifting sand occur. Tree and shrub species are often stunted due to environmental factors such as strong winds, salt sprays, and fluctuating water tables. Trees are usually found in protected areas behind the dune line. Tree height growth is restricted by salt spray, thus creating the pruned appearance of these species.

The beach dune and coastal strand communities are the most predominate vegetative communities present in each of the units. Natural vegetation consists of low-growing grasses, vines, lichens, and herbaceous plants with a few trees and shrub species. Grass species include bitter panicum, gulf bluestem, marsh hay, cordgrass, sand spur, sea oats, seashore paspalum, seashore panicum, low panicum, and seashore saltgrass. Herbaceous plants and vines include blanket flower, beach morning glory, large leaf pennywort, sea purslane, greenbriars, and wild

grape. Shrub and tree species include marshelder, rosemary, saw palmetto, yaupon, holly, sand live oak, and live oak. The soil in beach dunes ranges from well to extremely drained, with some being moderately to poorly drained. All are coarse and sterile in nature. The most abundant and visually striking soil association is the St. Lucie Association, which includes the white sand in the beach and dune areas. The incidence of natural occurring wildfire is rare in the beach dunes. Wildfire occurs infrequently in scrub communities, and when it does occur, it is usually a stand replacement fire.

The scrub community is characterized as having an open-to-closed canopy forest of sand pine with dense clumps or vast thickets of scrub oak dominating the understory. Ground cover is very sparse and consists mainly of lichens and a few grasses and herbs. Open patches of sand are common. Typical plants include sand pine, sand live oak, myrtle oak, saw palmetto, rosemary, ground lichens, and milk pea. Rare plant species include Florida perforate lichen (*Cladonia perforate*), Godfrey's golden aster (*Chrysopsis godfreyi*), Cruise's golden aster (*Chrysopsis gossypina ssp. cruiseana*), Gulf rockrose (*Helianthemum arenicola*), and Gulf coast lupine (*Lupinus westianus*).

Scrub occurs on sand ridges and former shorelines, some of which originated as wind-deposited dunes, others as wave-washed sand bars. Soils are excessively well drained, well washed, deep sand that are brilliant white at the surface. This is essentially a fire-maintained community. Scrub probably burns catastrophically once every 20 to 80 years or longer. This fire interval on the barrier islands themselves may be even longer. The largest portion of this community on Eglin's barrier islands occurs on the central unit, west of the Destin pass and south of U.S. Highway 98.

Scrubby flatwoods and mesic flatwoods occur in small, scattered, isolated pockets. Mesic flatwoods consist of open canopies of longleaf or slash pine and associated understory species. Mesic flatwoods occur on relatively flat, moderate to poorly drained terrain. Scrubby flatwoods may be intermixed with mesic flatwoods and are found on elevated relictual sand bars and dunes. Wildfire frequency in mesic flatwoods may occur from 1 to 8 years and from 8 to 25 years in scrubby flatwoods.

The salt marsh community is found wherever tidal salt waters have frequent access and where the direct wave action is not too severe. This community varies in amount from small pockets along the southern margin of Santa Rosa Island to the sheltered edge of the Santa Rosa Sound. Tree and shrub species are limited and usually consist of sea myrtle, wax myrtle, and sea oxeye. Herbaceous species include sawgrass, black needle rush, and salt marsh mallow. Soils associated with this community are level, poorly drained muck or sandy clay loams underlain by loamy sand. Wildfire rarely occurs in salt marsh communities. This is especially true when this community occurs in narrow bands along the periphery of the barrier islands. However, one lightning-caused wildfire has occurred on Okaloosa Island since 1999.

Some small, isolated freshwater marshes occur on Eglin's barrier island units. These are usually found in low troughs and swales behind the dune lines. Tree and shrub species are usually absent but may be found adjacent to these marshes. The vegetative community consists most of grasses, sedges, rushes, and other herbaceous plants. Maidencane and breakrushes are the dominant plant species present. Soils are nearly level and are very poorly drained. They are

coarse, textured, or organic and are underlain with sand. On Eglin's barrier islands, fire rarely occurs in freshwater marshes. The majority of the Barrier Island ecological association can be classified as Tier I.

At the present time, approximately 3,806 acres of Santa Rosa Island are administered by Eglin AFB. The primary mission and purpose of Santa Rosa Island is the operation of several radar sites and to maintain a corridor of Air Force land from Santa Rosa Island to the mainland to facilitate low-level flight paths needed to support the Eglin AFB mission. Other missions conducted on Santa Rosa Island include amphibious assault training by the Army Rangers, limited use of amphibious hovercraft at designated sites, and other miscellaneous activities, which occur infrequently. Prescribed fire has not been used on Santa Rosa Island. A few small wildfires have occurred resulting from the use of pyrotechnics. Past management efforts conducted by the Natural Resources Branch consist mainly of animal population surveys and monitoring and limited dune restoration efforts.

Present Condition

Public highways bisect both the central and eastern units. This has resulted in the creation of numerous trails and roads by the public to access the beachfront. Many of these trails have destroyed natural vegetation and have resulted in severe erosion.

The western unit is closed to public recreation due to the types and frequency of military activities. A paved road, open for official use only, runs the length of the western unit. The central and eastern units are open to public recreation. All areas are utilized for military operations to various degrees. The fragility of this ecosystem dictates that operations be restricted to only those activities that have minimal impact to soil surface, ground cover, dune infrastructure, and threatened and endangered species. The western and eastern portion is predominately natural to slightly modified. The central portion is somewhat less natural due to impact from public recreation. From aerial observation, it appears that all-terrain vehicles have operated in the freshwater ephemeral marshes located in the dune swales in the western unit. It is not known how recently this occurred or if it was associated with bonafide military operations.

Grasslands/Shrublands Ecological Association

The grasslands/shrublands ecological association occurs in areas of heavily disturbed sandhill ecological sites (U.S. Air Force, 1996). This habitat predominantly occurs within the test areas on Eglin AFB and is not as common within the interstitial area. However, there are some portions of the interstitial area that have been cleared (i.e., Duke Field and auxiliary fields) and have consequently become grasslands/shrublands. Typical vegetation in this association consists of native grasses such as switchgrass, broomsedge, big bluestems, yellow Indian grass, purple lovegrass, and various forbs. This habitat on test areas is maintained with machinery or fire that removes or prevents future growth.

References

U.S. Air Force, 1996. *Environmental Baseline Study* - *Resource Appendices* (SAIC). AFDTC (Air Force Test Development Center), 46 TW/XPE, Range Environmental Planning Office, Eglin Air Force Base, FL. 32542-6808.

APPENDIX G

SELECT MEU ACTIVITY EQUIPMENT DESCRIPTIONS AND PHOTOGRAPHS

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AV-8B Harrier II

Primary function: Attack and destroy surface targets under day and night visual conditions.
Manufacturer: McDonnell Douglas
Propulsion: One Rolls Royce F402-RR-406 or F402-RR-408 turbofan engine
Thrust:
F402-RR-406: 21,500 pounds
F402-44-208: 23,400 pounds
Length: 46.3 feet (14.11 meters)
Wing span: 30.3 feet (9.24 meters)
Cruise speed: Subsonic to transonic
Ferry range: 2100 nautical miles (2416.64 miles)
Combat radius:
close air support: 163 nautical miles (187.45 miles) with 30 minutes time on station
interdiction: 454 nautical miles (522.45 miles)
Armament: Seven external store stations, comprising six wing stations for AIM-9 Sidewinder and an assortment of air-to-ground weapons, external fuel tanks and AGM-65 Maverick missiles; one centerline station for DECM pod or air-to-ground ordnance. A GAU-12 25MM six-barrel gun pod can be mounted on the centerline and has a 300 round capacity with a lead computing optical sight system (LCOSS) gunsight.
Crew: 1
Introduction date: 12 January 1985, AV-8BII(Plus) introduced in June 1993
Unit Replacement Cost: $23,700,000

Mission: The mission of the VMA STOVL squadron is to attack and destroy surface and air targets, to escort helicopters, and to conduct other such air operations as may be directed. Specific tasks of the AV-8B HARRIER II include:
- Conduct close air support using conventional and specific weapons.
- Conduct deep air support, to include armed reconnaissance and air interdiction, using conventional and specific weapons.
- Conduct offensive and defensive antiair warfare. This includes combat air patrol, armed escort missions, and offensive missions against enemy ground-to-air defenses, all within the capabilities of the aircraft.
- Be able to operate and deliver ordnance at night and to operate under instrument flight conditions.
- Be able to deploy for extended operations employing aerial refueling.
- Be able to deploy to and operate from carriers and other suitable seagoing platforms, advanced bases, expeditionary airfields, and remote tactical landing sites.

Features: The AV-8B V/STOL strike aircraft was designed to replace the AV-8A and the A-4M light attack aircraft. The Marine Corps requirement for a V/STOL light attack force has been well documented since the late 1950's. Combining tactical mobility, responsiveness, reduced operating cost and basing flexibility, both afloat and ashore, V/STOL aircraft are particularly well-suited to the special combat and expeditionary requirements of the Marine Corps. The AV-8BII+ features the APG-65 Radar common to the F/A-18, as well as all previous systems and features common to the AV-8BII.

Inventory: 7 squadrons with 20 aircraft each and 1 training squadron with 20 AV-8B and 15 TAV-8B aircraft for a total 175 aircraft.

Background: Operation Desert Storm in 1991 was highlighted by expeditionary air operations performed by the AV-8B. The Harrier II was the first Marine Corps tactical strike platform to arrive in theater, and subsequently operated from various basing postures. Three squadrons, totaling 60 aircraft, and one six-aircraft detachment operated ashore from an expeditionary airfield, while one squadron of 20 aircraft operated from a sea platform. During the ground war, AV-8Bs were based as close as 35 nautical miles (40.22 miles) from the Kuwait border, making them the most forward deployed tactical strike aircraft in theater. The AV-8B flew 3,380 sorties for a total of 4,083 flight hours while maintaining a mission capable rate in excess of 90%. Average turnaround time during the ground war surge rate flight operations was 23 minutes.

F/A-18A/C/CN Hornet

Primary function: Intercept and destroy enemy aircraft under all-weather conditions and attack and destroy surface targets.
Manufacturer: McDonnell Douglas
Propulsion: Two General Electric F404-GE-400 afterburning, low bypass turbofan engines
Thrust: 16,000 pounds per engine
Length: 56 feet (17.06 meters)
Wing span: 37.5 feet (11.43 meters)
Cruise speed: High subsonic to supersonic
Ferry range: Over 2,000 nautical miles (2300 miles)
Combat radius:
Fighter mission: 400 nautical miles (460 miles)
Attack mission: 575 nautical miles (661.25 miles)
Armament: Nine external wing stations, comprising two wingtip stations for an assortment of air-to-air and air-to-ground weapons, including AIM-7 Sparrows, AIM-9 Sidewinders, AMRAAMs, AGM-84 Harpoons and AGM-65 Maverick missiles; two inboard wing stations for external fuel tanks or air-to-ground stations; two nacelle fuselage stations for Sparrows or AN/AAS-38 Forward Looking Infrared Radar (FLIR) pods; and a center station for fuel tank or air-to-ground weapons. Air-to-ground weapons include GBU-10 and -12 laser guided bombs, Mk 80 series general purpose bombs, and CBU-59 cluster bombs. AN M61 20mm six-barrel gun is mounted in the nose and has a McDonnell Douglas director gunsight.
Crew: 1
Introduction date: March 1983
Unit Replacement Cost: $28,100,000

Mission: Specific F/A-18A/C/CN tasks include:
- Intercept and destroy enemy aircraft in conjunction with ground or airborne fighter control under all-weather conditions.
- Conduct day and night close air support under the weather.
- Conduct day and night deep air support, under the weather. Deep air support consists of radar search and attack, interdiction, and strikes against enemy installations using all types of weapons compatible with assigned aircraft.
- Conduct armed escort of friendly aircraft.
- Be able to operate from aircraft carriers, advanced bases, and expeditionary airfields.
- Be able to deploy or conduct extended range operations employing aerial refueling.

Features: The Marine Corps F/A-18A/C/CN strike fighter multi-mission aircraft was designed to replace the F-4 Phantom. The F/A-18A/C/CN Hornet is missionized for traditional fighter, attack, and close air support roles through selection of external pods/equipment to accomplish specific mission objectives. Any aircraft can quickly be configured to perform either fighter or attack missions, or both, thus providing the Marine Air Ground Task Force (MAGTF) commander more flexibility in employing his tactical aircraft in a rapidly changing scenario. Marine F/A18s may be land-based from prepared airfields, or they can operate from expeditionary airfields (EAF). They may also be sea-based, operating from the decks of Navy aircraft carriers.

Inventory: 10 active and 4 reserve squadrons with 12 planes each for a total of 168 planes.

Background: Operation Desert Storm in 1991 was the operational proving ground for the F/A-18A/C. Six single-seat F/A-18A/C squadrons deployed to SWA to participate in combat operations. These squadrons flew in excess of 4600 sorties for a total of 8864 hours while experiencing no combat losses.

KC-130 Hercules

Primary function: In-flight refueling; tactical transport
Manufacturer: Lockheed
Power plant: Four Allison T56-A-16 engines
Power: 4,910 shaft horsepower per engine
Length:
Aircraft: 97 feet, 9 inches (22.16 meters)
Cargo compartment: 41 feet (12.49 meters)
Width of Cargo compartment: 10 feet, 3 inches (3.12 meters)
Height:
Aircraft: 38 feet, 4 inches (11.68 meters)
Cargo compartment: 9 feet (2.74 meters)
Wing span: 132 feet, 7 inches (40.39 meters)
Maximum takeoff weight: 175,000 pounds (79,450 kilograms)
Ceiling: 30,000 feet (9,140 meters)
Speed: 315 knots (362.25 miles per hour)
Operating weight: 83,300 pounds (37,818 kilograms)
Total fuel capacity:
KC-130T and KC-130: 13,280 gallons (50,331 liters)/86,320 pounds (32,715 liters)
KC-130F: 10,183 gallons (38,594 liters)/ 66,190 pounds (25,086 liters)
Range:
Tanker mission: 1000 nautical mile (1150 mile) radius with 45,000 pounds of fuel (20,430 kilograms) (KC-130R/T)
Cargo mission: 2875 nautical miles (3306.25 miles) with 38,258 pounds (17,369 kilograms) of cargo (KC-130R/T) or 92 combat troops or 64 paratroopers or 74 litters
Landing distance: Less than 2,600 feet
Crew: 2 pilots, 1 navigator/systems operator, 1 flight engineer, 1 first mechanic, 1 loadmaster (total of 6)
Introduction date:
KC-130F: 1962
KC-130R: 1976
KC-130T: 1983
Unit Replacement Cost: $37,000,000

Mission: The KC-130 is a multi-role, multi-mission tactical tanker/transport which provides the support required by Marine Air Ground Task Forces. This versatile asset provides in-flight refueling to both tactical aircraft and helicopters as well as rapid ground refueling when required.

Additional tasks performed are aerial delivery of troops and cargo, emergency resupply into unimproved landing zones within the objective or battle area, airborne Direct Air Support Center, emergency medevac, tactical insertion of combat troops and equipment, evacuation missions, and support as required of special operations capable Marine Air Ground Task Forces.

Features: The KC-130 is equipped with a removable 3600 gallon (136.26 hectoliter) stainless steel fuel tank that is carried inside the cargo compartment providing additional fuel when required. The two wing-mounted hose and drogue refueling pods each transfer up to 300 gallons per minute (1135.5 liters per minute) to two aircraft simultaneously allowing for rapid cycle times of multiple-receiver aircraft formations (a typical tanker formation of four aircraft in less than 30 minutes). Some KC-130s are also equipped with defensive electronic and infrared countermeasures systems. Development is currently under way for the incorporation of interior/exterior night vision lighting, night vision goggle heads-up displays, global positioning system, and jam-resistant radios.

Inventory:
Active: 37 KC-130Fs and 14 KC-130Rs (51 total)
Reserve: 24 KC-130Ts

AH-1W Super Cobra Helicopter

Primary function: Attack helicopter
Manufacturer: Bell Helicopter Textron
Power plant: Two General Electric T700-GE-401 engines
Thrust:
Full: 2082 shaft horsepower for 30 minutes (transmission limited),
Continuous: 1775 shaft horsepower
Length: 58 feet (17.67 meters)
Height: 13.7 feet (4.17 meters)
Rotor Diameter: 48 feet (14.62 meters)
Speed: 147 knots (169.05 miles per hour) in basic combat attack configuration
Maximum takeoff weight: 14,750 pounds (6,696.50 kilograms)
Range: 256 nautical miles (294.4 miles) in basic combat attack configuration
Ceiling: 18,700 feet (5703.5 meters) in basic combat attack configuration (limited to 10,000 feet (3050 kilometers) by oxygen requirements)
Crew: 2 officers
Armament: One 20MM turreted cannon with 750 rounds; four external wing stations that can fire 2.75"/5.0" rockets and a wide variety of precision guided missiles, to include TOW/Hellfire (point target/anti-armor), Sidewinder (anti-air) Sidearm (anti-radar).
Introduction date: 1986
Unit Replacement Cost: $10,700,000

Mission: Fire support and security for forward and rear area forces, point target/anti-armor, anti-helicopter, armed escort, supporting arms control and coordination, point and limited area air defense from enemy fixed-wing aircraft, armed and visual reconnaissance.

Features: The AH-1W Super Cobra is a day/night marginal weather Marine Corps attack helicopter that provides enroute escort for our assault helicopters and their embarked forces. The AH-1W is a two-place, tandem-seat, twin-engine helicopter capable of land- or sea-based operations. The AH-1W provides fire support and fire support coordination to the landing force during amphibious assaults and subsequent operations ashore.

The AH-1W is operated in eight composite HMLA squadrons composed of 18 AH-1 and 9 UH-1 aircraft. The AH-1W is curretnly being outfitted with a Night Targeting System/Forward Looking Infrared Radar that provides laser rangefinding/designating and camera capabilities.

Inventory: 147

Background: The Marine Corps deployed 4 of 6 active force squadrons (48 AH-1Ws) to Southwest Asia during Operation Desert Shield/Desert Storm. These helicopters destroyed 97 tanks, 104 armored personnel carriers and vehicles, 16 bunkers and 2 antiaircraft artillery sites without the loss of any aircraft. The deployment required no additional augmentation to squadron support personnel and only one Bell Helicopter technical representative.

UH-1N Huey Helicopter

Primary function: Utility helicopter
Manufacturer: Bell Helicopter Textron
Power plant: Pratt and Whitney T400-CP-400
Power:
Burst: 1290 shaft horsepower (transmission limited)
Continuous: 1134 shaft horsepower (transmission limited)
Length: 57.3 feet (17.46 meters)
Height: 14.9 feet (4.54 meters)
Rotor Diameter: 48 feet (14.62 meters)
Speed: 121 knots (139.15 miles per hour) at sea level
Ceiling: 14,200 feet (4331 meters) (limited to 10,000 feet (3050 meters) by oxygen requirements)
Maximum takeoff weight: 10,500 pounds (4,767 kilograms)
Range: 172 nautical miles (197.8 miles)
Crew:
Officer: 2
Enlisted: 2
Armament: M-240 7.62mm machine gun or the GAU-16 .50 caliber machine gun or the GAU-17 7.62mm automatic gun. All three weapons systems are crew-served, and the GAU-2B/A can also be controlled by the pilot in the fixed forward firing mode. The helicopter can also carry two 7-shot or 19-shot 2.75" rocket pods.
Introduction date: 1971
Unit Replacement Cost: $4,700,000

Mission: Airborne command and control, combat assault, medical evacuation, maritime special operations, supporting arms control and coordination, fire support and security for forward and rear area forces.

Features: The UH-1N is a twin-piloted, twin-engine helicopter used in command and control, resupply, casualty evacuation, liaison and troop transport. The Huey provides utility combat helicopter support to the landing force commander during ship-to-shore movement and in subsequent operations ashore.
The aircraft can be outfitted to support operations such as command and control with a specialized communication package (ASC-26), supporting arms coordination, assault support,

medical evacuation for up to six litter patients and one medical attendant, external cargo, search and rescue using a rescue hoist, reconnaissance and reconnaissance support, and special operations using a new navigational thermal imaging system mission kit.
Considered to be the most widely used helicopter in the world, with more than 9,000 produced from the 1950s to the present, the Huey is flown today by about 40 countries.

Inventory: 107

CH-53E Super Stallion Helicopter

Primary function: Transportation of heavy equipment and supplies during the ship-to-shore movement of an amphibious assault and during subsequent operations ashore.
Manufacturer: Sikorsky Aircraft
Power plant: Three General Electric T64-GE-416 turboshaft engines producing 4380 shaft horsepower each.
Length: 99 feet 5 inches (2.64 meters)
Height: 28 feet 4 inches (.81 meters)
Rotor diameter: 79 feet (24.07 meters)
Speed: 172.5 miles per hour (150 knots)
Maximum takeoff weight:
Internal load: 69,750 pounds (31,666 kilograms)
External load: 73,500 pounds (33,369 kilograms)
Range:
without refueling: 621 miles (540 nautical miles)
with aerial refueling: indefinite
Armament: Two XM-218 .50 caliber machineguns.
Crew: 3
Introduction date: June 1981
Unit Replacement Cost: $26,100,000

Mission: As the Marine Corps' heavy lift helicopter designed for the transportation of material and supplies, the CH-53E is compatible with most amphibious class ships and is carried routinely aboard LHA (Landing, Helicopter, Assault: an amphibious assault ship), LPH (Landing Platform, Helicopter: an amphibious assault ship) and now LHD (Landing, Helicopter, Dock: an amphibious assault ship) type ships. The helicopter is capable of lifting 16 tons (14.5 metric tons) at sea level, transporting the load 50 nautical miles (57.5 miles) and returning. A typical load would be a 16,000 pound (7264 kilogram) M198 howitzer or a 26,000 pound (11,804 kilogram) Light Armored Vehicle. The aircraft also can retrieve downed aircraft including another CH-53E. The 53E is equipped with a refueling probe and can be refueled in flight giving the helicopter indefinite range.

Features: The CH-53E is a follow-on for its predecessor, the CH-53D. Improvements include the addition of a third engine to give the aircraft the ability to lift the majority of the Fleet Marine Force's equipment, a dual point cargo hook system, improved main rotor blades, and composite

tail rotor blades. A dual digital automatic flight control system and engine anti-ice system give the aircraft an all-weather capability. The helicopter seats 37 passengers in its normal configuration and has provisions to carry 55 passengers with centerline seats installed. With the dual point hook systems, it can carry external loads at increased airspeeds due to the stability achieved with the dual point system.

Inventory: 160

Background: Derived from an engineering change proposal to the twin-engine CH-53D helicopter, the CH-53E has consistently proven its worth to the Fleet commanders with its versatility and range. With four and one half hours' endurance, the Super Stallion can move more equipment over rugged terrain in bad weather and at night. During Operation Eastern Exit two CH-53Es launched from amphibious ships and flew 463 nautical miles (532.45 miles) at night, refueling twice enroute, to rescue American and foreign allies from the American Embassy in the civil war-torn capital of Mogadishu, Somalia in January of 1990. Two CH-53Es rescued Air Force Capt. Scott O'Grady in Bosnia in June 1995.

CH-46E Sea Knight Helicopter

Primary function: Medium lift assault helicopter
Manufacturer: Boeing Vertol Company
Power plant: (2) GE-T58-16 engines
Thrust:
Burst: 1870 shaft horsepower (SHP)
Continuous: 1770 SHP
Length:
Rotors unfolded: 84 feet, 4 inches (25.69 meters)
Rotors folded: 45 feet, 7.5 inches (13.89 meters)
Width:
Rotors unfolded: 51 feet (15.54 meters)
Rotors folded: 14 feet, 9 inches (4.49 meters)
Height: 16 feet, 8 inches (5.08 meters)
Maximum takeoff weight: 24,300 pounds (11,032 kilograms)
Range: 132 nautical miles (151.8 miles) for an assault mission
Speed: 145 knots (166.75 miles per hour)
Ceiling: 10,000 feet (+)
Crew:
Normal: 4 - pilot, copilot, crew chief, and 1st mechanic
Combat: 5 - pilot, copilot, crew chief, and 2 aerial gunners
Payload:
Combat: maximum of 14 troops with aerial gunners
Medical evacuation: 15 litters and 2 attendants
Cargo: maximum of 4,000 pound (2270 kilograms) external load
Introduction date: January 1978
Unit Replacement Cost: No current medium-lift replacement, would not replace.

Mission: The mission of the CH-46E Sea Knight helicopter in a Marine Medium Helicopter (HMM) squadron is to provide all-weather, day/night, night vision goggle (NVG) assault transport of combat troops, supplies, and equipment during amphibious and subsequent operations ashore. Troop assault is the primary function and the movement of supplies and equipment is secondary. Additional tasks are: combat and assault support for evacuation operations and other maritime special operations; over-water search and rescue augmentation;

support for mobile forward refueling and rearming points; aeromedical evacuation of casualties from the field to suitable medical facilities.

Inventory: 239

Background: The CH-46 Sea Knight was first procured in 1964 to meet the medium-lift requirements of the Marine Corps in Viet Nam with a program buy of 600 aircraft. The aircraft has served the Marine Corps in all combat and peacetime environments. However, normal airframe operational and attrition rates have taken the assets to the point where a medium lift replacement is required. The safety and capability upgrades are interim measures to allow continued safe and effective operation of the Sea Knight fleet until a suitable replacement is fielded.

Light Armored Vehicle-25 (LAV-25)

Primary function: Provide strategic mobility to reach and engage the threat, tactical mobility for effective use of fire power, fire power to defeat soft and armored targets, battlefield survivability to carry out combat missions.
Length: 251.6 inches (6.39 meters)
Height: 106.0 inches, (101.0 with pintle mount removed) (2.69 meters)
Width: 98.4 inches (turret facing forward) (2.5 meters)
Weight: 24,100 pounds (10,941 kilograms)
Combat Weight: 28,200 pounds (12,802.8 kilograms)
Range: 410 miles (660.1 kilometers)
Speed: 62 mph (99.2 km/hr)
Swim speed: 6 mph (9.6 km/hr)
Crew: Driver, gunner, commander and 6 troops
Armament: M242 25mm chain gun, M240 7.62mm machine gun mounted coaxial to the main gun
Unit Replacement Cost: $900,000

Features: The LAV-25 is an all-terrain, all-weather vehicle with night capabilities. It is air transportable via C-130, C-141, C-5 and CH-53 E. When combat loaded there are 210 ready rounds and 420 stowed rounds of 25 mm ammunition as well as 400 ready rounds and 1200 stowed rounds of 7.62mm. There are 8 ready rounds and 8 stowed rounds of smoke grenades. A supplementary M240E1 7.62mm machine gun can be pintle-mounted at the commander's station in the turret. The LAV-25 is fully amphibious with a maximum of 3 minutes preparation.

Inventory: 401

Assault Amphibian Vehicle Personnel Model 7A1 (AAVP7A1)

Description: The AAVP7A1 is an armored assault amphibious full-tracked landing vehicle. The vehicle carries troops in water operations from ship to shore, through rough water and surf zone. It also carries troops to inland objectives after ashore.
Manufacturer: FMC Corporation
Date First Prototype: 1979
Date First Production Vehicle: 1983
Crew: 3
Weight:
Unloaded: 46,314 Pounds (With EAAK, Less Crew, Fuel, OEM, and Ammo)
Combat Equipped: 50,758 Pounds (EAAK, Crew, Fuel, OEM, and Ammo)
Troop Loaded: 56,743 Pounds (Combat Equipped with Troops)
Cargo Loaded: 60,758 Pounds (Combat Equipped with Cargo)
Mine Clearance Kit: 61,158 Pounds (Combat Equipped with MKl MOD 0 MCS)
Load Capacity: 21 Combat Equipped Troops (@ 285 Pounds) or 10,000 Pounds of Cargo
Fuel Capacity: 171 Gallons
Cruising Range:
Land at 25 MPH: 300 Miles
Water at 2600 RPM: 7 Hours
Cruising Speed:
Land: 20 to 30 MPH
Water: 6 MPH
Maximum Speed Forward:
Land: 45 MPH
Water: 8.2 MPH
Maximum Speed Reverse:
Land: 12 MPH
Water: 4.5 MPH
Engine:
Make: Cummins
Model: VT400
Type: 4 Cycle, 8 Cylinder, 90' Vee, Water Cooled, Turbocharged
Fuel: Multifuel

Cargo Compartment:
Length: 13.5 Feet
Width: 6.0 Feet
Height: 5.5 Feet
Volume: 445.5 Cubic Feet
Capacity: 21 Combat Equipped Troops
Armament and Ammunition: HBM2 Caliber.50 Machine Gun and MK 19 MOD3 40 MM Machine Gun
Unit Replacement Cost: $2.2 - 2.5 Million

Background: The AAV7A1 is the newest Assault Amphibian in a series that started with the Roebling ALLIGATOR. The Alligator was developed over a period of 7 years, starting in 1932. The first "Gators" were a disappointment, in that the water speed was only 2.5 mph. The land speed was 25 mph. Through design changes, and by using larger engines, the water speed of the Alligator was increased to 8.6 mph by 1939. In 1940, Roebling built a new model which was designated the CROCODILE. The Crocodile had a land speed of 25 mph and a water speed of 9.4 mph.
The LVT-1 was a direct copy of the Crocodile, except that it was fabricated from sheet steel instead of aluminum. The LVT-1 was in production from 1941 to 1943. Being heavier, the land speed of the LVT-1 was 18 mph and the water speed was 7 mph. A 6-cylinder, 146 hp Hercules engine was used for power. The LVT-1 was propelled by two endless chains fitted with cleats, both in the water and on land. The first LVT-1's were used as logistic support vehicles only. They were not armored and carried no armament, however, this soon changed. At the Battle of Tarawa, bolted on armor plate was used and the vehicles were equipped with one to four 30 cal. machine guns.
The second generation of LVT's was the LVT-2. This vehicle was developed in 1941 and was in production from 1942 to 1945. The LVT-2 was the basic design for a series of vehicles used during WW II. This family of vehicles included the: LVTA1, LVTA2, LVT4, LVTA4, and LVTA5. A few of the LVTA5s were modified in 1949 and continued in service until the mid 1950s. These vehicles were powered with 7-cylinder radial aircraft engines built by Continental Motors. These engines developed 220hp, their service life was very short. Major overhaul was scheduled for 100 hours, however few ever lasted that long. The transmission was a 5 speed, manual shift SPICER that incorporated a manually operated steer differential. This transmission had been developed for the M-3 light tank. As a result, the transmission was too narrow for the LVT. This problem was overcome by using four final drives. The internal finals were bolted to the transmission / differential gear case and supported by two mounting yokes. The external final drives were bolted to the hull and powered the drive sprockets. This generation of LVTs was used through the Okinawa campaign in 1945.

M1A1 Main Battle Tank

Primary function: Main battle tank (MBT)
Manufacturer: General Dynamics (Land Systems Division)
Power plant: AGT-1500 turbine engine
Power train: Hydrokinetic, fully automatic with four forward and two reverse gear ratios.
Propulsion: 1500 horsepower gas (multi-fuel) turbine engine
Length, Gun Forward: 385 inches (9.78 meters)
Width: 144 inches (3.66 meters)
Height: 114 inches w/o DWFK (2.89 meters)
Weight fully armed: 67.7 tons (61.4 metric tons)
Caliber: 120mm (M256 main gun)
Commander's Weapon: M2 .50 Caliber Machine Gun
Loader's Weapon: 7.62mm M240 Machine Gun
Coaxial Weapon: 7.62 M240 Machine Gun
Cruising Range: 289 miles (465.29 kilometers) without NBC system
279 miles (449.19 kilometers) with NBC system
Sight radius: 8 degrees at 8 power
Speed:
Maximum: 42 miles (67.72 kilometers) per hour (Governed)
Cross Country: 30 miles (48.3 kilometers) per hour
Ground clearance: 19 inches (48.26 centimeters)
Obstacle crossing:
Vertical: 42 inches (106.68 centimeters)
Trench: 9 feet wide (2.74 meters)
Slope: 60 degrees at 4.5 miles (7.24 kilometers) per hour
Units: Two active duty battalions and two reserve battalions
Crew: A four-man crew composed of a driver, loader, gunner, and tank commander.
Warheads: M1A1 tank is capable of delivering both kinetic energy (sabot) and chemical energy (heat) rounds.
Armament:
Main: 120mm M256 main gun
Secondary: (1) .50 caliber M2 machine guns
(2) 7.62mm M240 machine guns
Sensors: The 120mm M256 main gun has a cant sensor, wind speed sensor, automatic lead and ammunition temperature inputs to its ballistic fire control solution.
Introduction date: November 1990
Unit Replacement Cost: $4,300,000

Features: The M1A1 is an improved version of the M1 Main Battle Tank (MBT). It includes a 120mm smoothbore main gun, an NBC overpressure protection system, and an improved armor package. This tank significantly increases the capabilities of the Fleet Marine Forces across the full spectrum of conflict in the near and midterm. Engagement ranges approaching 4000 meters were successfully demonstrated during Operation Desert Storm.
The M1A1 Tank, in addition to the improved armor, 120mm smoothbore gun and the NBC overpressure system, has a Deep Water Fording Kit (DWFK), a Position Location Reporting Systems (PLRS), enhanced ship tiedowns, Digital Electronic Control Unit (DECU) (which allows significant fuel savings),and Battlefield Override. The M1A1 MBT has the capability to conduct operations ashore. It is compatible with all US Navy amphibious ships and craft (to include the LCAC) and Maritime Prepositioning Ships (MPS).

Inventory: 403

Background: The Marine Corps has fielded the M1A1 Common Tank to replace the aging M60A1 Rise/Passive tank. The M60 has reached the end of its service life and lacks the capability to survive and to defeat the threats expected to be encountered on the modern battlefield. Due to unique Marine Corps amphibious requirements, and the need for both supportability and interoperability between the Marine Corps and the US Army, the two services agreed to jointly produce the M1A1 Main Battle Tank. During Operation Desert Shield/Storm, the Marine Corps borrowed 60 M1A1s (called the M1A1 Heavy Armor) from the US Army. There were also 16 Marine Corps M1A1 Tanks delivered on an accelerated schedule for employment during the operation. This total of 76 M1A1 tanks was employed by 2d Tank Battalion and elements of 4th Tank Battalion. All loaned tanks were returned to the US Army after Desert Storm. The USMC will complete fielding of all tanks, to include active, reserve, MPS, and depot maintenance float (DMF) during FY 96.

High Mobility Multipurpose Wheeled Vehicle (HMMWV) (M998 Truck)

Primary function: The HMMWV provides a variety of wheeled vehicle platforms. These are cargo/troop carrier, armament carrier, TOW missile system carrier, shelter carrier and two ambulance variants (2- and 4-litter). The HMMWV will also be the prime mover for the AN/TRC-170 Radio Digital Terminal and the Pedestal Mounted Stinger System.
Length: 15 feet (4.57 meters)
Width: 7.08 feet (2.16 meters)
Weight: 5,200 pounds (2359 kilograms)
Height: 6.00 feet (1.83 meters) reducible to 4.5 feet (1.37 meters)
Engine: V8, 6.2 litre displacement, fuel injected diesel, liquid cooled, compression ignition
Horsepower: 150 at 3,600 RPM
Transmission: 3 speed, automatic
Transfer case: 2 speed, locking, chain driven
Electrical system: 24 volt, negative ground, 60 amps
Brakes: Hydraulic, 4-wheeled disc
Fording depth:
without preparation: 2.5 feet (76.2 centimeters)
with deep water fording kit: 5 feet (1.5 meters)
Fuel type: Diesel
Fuel capacity: 25 gallons (94.63 liters)
Range: 350 miles (563.15 kilometers) highway
Unit Replacement Cost: $50,000

Mission: The M998 is the baseline vehicle for the M998 series of 1 1/4-ton trucks, which are known as the HMMWV vehicles. The HMMWV vehicles include 11 variants. They are: M998 Cargo/Troop Carrier; M1038 Cargo/Troop Carrier, with winch; M1043 Armament Carrier; M1044 Armament Carrier, with winch; M1045 TOW Carrier; M1046 TOW Carrier, with winch; M997 Ambulance, basic armor 4-Litter; M1035 Ambulance, 2-Litter; M1037 Shelter Carrier; M1042 Shelter Carrier, with winch; M1097 Heavy HMMWV (payload of 4,400 pounds). All HMMWVS are designed for use over all types of roads, in all weather conditions and are extremely effective in the most difficult terrain. The HMMWVS high power-to-weight ratio, four wheeled drive and high ground clearance combine to give it outstanding cross-country mobility.

Inventory: 19,598

M198 155mm Medium Howitzer, Towed

Primary function: Provides field artillery fire support for all Marine Corps Air Ground Task Force organizations.
Manufacturer: Rock Island
Contractor: AMCCOM
Length:
In tow: 40 feet, 6 inches (12.30 meters)
Firing: 36 feet, 2 inches (11.01 meters)
Width in tow: 9 feet, 2 inches (2.79 meters)
Height in tow: 9 feet, 6 inches (2.89 meters)
Weight: 15,758 pounds (7.154 kilograms)
Bore diameter: 155mm
Maximum effective range:
conventional ammunition: 22,400 meters (13.92 miles)
rocket-assisted projectile: 30,000 meters (18.64 miles)
Rate of Fire:
Maximum: 4 rounds per minute
Sustained: 2 rounds per minute
Crew: 9 enlisted
Unit Replacement Cost: $527,337

Features: The M198 Medium Towed Howitzer is a 155mm field artillery howitzer. It is constructed of aluminum and steel, and is air transportable by CH-53E helicopter, and C-130 or larger fixed-wing aircraft. The M198 provides increased range, and improved reliability and maintainability over the former standard towed 155mm howitzer, the M114A2. The use of rocket-assisted projectiles significantly extends the range, lethality, and counterbattery fires of the direct support artillery battalions. The M198 fires all current and developmental 155mm ammunition.

Inventory: 541

Background: The first 10 M198 Howitzers were delivered to the 10th Marine Regiment in January 1982.

M252 81mm Medium Extended Range Mortar

Length: 56 inches (142.24 centimeters)
Weight:
Mortar Assembly: 35 pounds (15.89 kg)
Bipod: 26 pounds (11.80 kilograms)
Baseplate: 25.5 pounds (11.58 kilograms)
Sight Unit: 2.5 pounds (1.14 kilograms)
Total: 89 pounds (40.41 kilograms)
Bore diameter: 81mm
Maximum effective range: 5700 meters
Rates of fire:
Maximum: 33 rounds per minute
Sustained: 16 rounds per minute
Elevation: 45 to 85 degrees
Unit Replacement Cost: $24,717

Features: The M252 81mm Medium Extended Range Mortar is a crew-served, medium weight mortar which is highly accurate and provides for a greater range (4,500 meters to 5,650 meters) and lethality than the previous 81mm mortar. The cannon has a crew-removable breech plug and firing pin. The muzzle end has a short tapered lead-in which acts as a blast attenuator device. The breech end is finned for better cooling. This mortar also uses the standard M64 mortar sight of the 60mm mortar, M224.

Background: This mortar replaced the previous Marine Corps 81mm mortar in 1986. The M252 is an adaptation of the standard British 81mm mortar developed in the 1970s. It is mostly commonly found in the mortar platoon of an infantry battalion.

M224 60mm Lightweight Mortar

Length: 40 inches (101.6 centimeters)
Weight: 46.5 pounds (21.11 kilograms)
Bore diameter: 60mm
Maximum effective range: 2.17 miles (3490 meters)
Rates of fire:
Maximum: 30 rounds/minute
Sustained: 20 rounds/minute
Unit Replacement Cost: $10,658

Mission: To provide the company commander with an indirect-fire weapon.

Features: The M224 60mm Lightweight Mortar is a smooth bore, muzzle loading, high-angle-of-fire weapon. The cannon assembly is composed of the barrel, combination base cap, and firing mechanism. The mount consists of a bipod and a base plate which is provided with screw type elevating and traversing mechanisms to elevate/traverse the mortar. The M64 sight unit is attached to the bipod mount via a standard dovetail. An additional short range sight is attached to the base of the cannon tube for firing the mortar on the move and during assaults. It has a spring-type shock absorber to absorb the shock of recoil in firing.

Background: The M224 replaced the older (WWII era) M2 and M19, 60mm Mortars. These weapons only possessed 2,200 yards of effective range. The M224 was designed to fire all types of the older ammunition, but its primary rounds are of the newer, longer-range type.

Squad Automatic Weapon (SAW), M249 Light Machine Gun

Primary function: Hand-held combat machine gun
Manufacturer: Fabrique Nationale Manufacturing, Inc.
Length: 40.87 inches (103.81 centimeters)
Weight:
With bipod and tools: 15.16 pounds (6.88 kilograms)
200-round box magazine: 6.92 pounds (3.14 kilograms)
30-round magazine: 1.07 pounds (.49 kilograms)
Bore diameter: 5.56mm (.233 inches)
Maximum effective range: 3281 feet (1000 meters) for an area target
Maximum range: 2.23 miles (3.6 kilometers)
Rates of fire:
Cyclic: 725 rounds per minute
Sustained: 85 rounds per minute
Unit Replacement Cost: $4,087

Features: The Squad Automatic Weapon (SAW), or 5.56mm M249 is an individually portable, gas operated, magazine or disintegrating metallic link-belt fed, light machine gun with fixed headspace and quick change barrel feature. The M249 engages point targets out to 800 meters, firing the improved NATO standard 5.56mm cartridge.
The SAW forms the basis of firepower for the fire team. The gunner has the option of using 30-round M16 magazines or linked ammunition from pre-loaded 200-round plastic magazines. The gunner's basic load is 600 rounds of linked ammunition.

Background: The SAW was developed through an initially Army-led research and development effort and eventually a Joint NDO program in the late 1970s/early 1980s to restore sustained and accurate automatic weapons fire to the fire team and squad. When actually fielded in the mid-1980s, the SAW was issued as a one-for-one replacement for the designated "automatic rifle" (M16A1) in the Fire Team. In this regard, the SAW filled the void created by the retirement of the Browning Automatic Rifle (BAR) during the 1950s because interim automatic weapons (e.g. M-14E2/M16A1) had failed as viable "base of fire" weapons. Early in the SAW's fielding, the Army identified the need for a Product Improvement Program (PIP) to enhance the weapon. This effort resulted in a "PIP kit" which modifies the barrel, handguard, stock, pistol grip, buffer, and sights.

M16A2 5.56mm Rifle

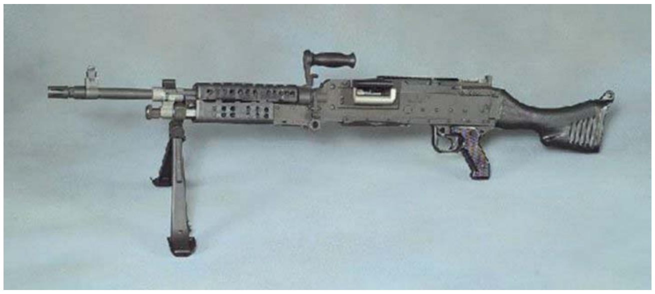
Primary function: Infantry weapon
Manufacturer: Colt Manufacturing and Fabrique Nationale Manufacturing Inc.
Length: 39.63 inches (100.66 centimeters)
Weight, with 30 round magazine: 8.79 pounds (3.99 kilograms)
Bore diameter: 5.56mm (.233 inches)
Maximum effective range:
Area target: 2,624.8 feet (800 meters)
Point target: 1,804.5 feet (550 meters)
Muzzle velocity: 2,800 feet (853 meters) per second
Rate of fire:
Cyclic: 800 rounds per minute
Sustained: 12-15 rounds per minute
Semiautomatic: 45 rounds per minute
Burst: 90 rounds per minute
Magazine capacity: 30 rounds
Unit Replacement Cost: $586

Features: The M16A2 5.56mm rifle is a lightweight, air-cooled, gas-operated, magazine-fed, shoulder- or hip-fired weapon designed for either automatic fire (3-round bursts) or semiautomatic fire (single shot) through the use of a selector lever. The weapon has a fully adjustable rear sight. The bottom of the trigger guard opens to provide access to the trigger while wearing winter mittens. The upper receiver/barrel assembly has a fully adjustable rear sight and a compensator which helps keep the muzzle down during firing. The steel bolt group and barrel extension are designed with locking lugs which lock the bolt group to the barrel extension allowing the rifle to have a lightweight aluminum receiver.

Background: The M16A2 rifle is a product improvement of the M16A1 rifle. The improvements are:
* a heavier, stiffer barrel than the barrel of the M16A1;
* a redesigned handguard, using two identical halves, with a round contour which is sturdier and provides a better grip when holding the rifle;
* a new buttstock and pistol grip made of a tougher injection moldable plastic that provides much greater resistance to breakage;
* an improved rear sight which can be easily adjusted for windage and range;
* a modified upper receiver design to deflect ejected cartridges, and preclude the possibility of the ejected cartridges hitting the face of a left-handed firer;

* a burst control device, that limits the number of rounds fired in the automatic mode to three per trigger pull, which increases accuracy while reducing ammunition expenditure;
* a muzzle compensator, designed to reduce position disclosure and improve controllability and accuracy in both burst and rapid semi-automatic fire;
* a heavier barrel with a 1 in 7 twist to fire NATO standard SS 109 type (M855) ammunition which is also fired from the M249 Squad Automatic Weapon (SAW). This further increases the effective range and penetration of the rifle cartridge. The M16A2 will also shoot the older M193 ammunition designed for a 1 in 12 twist.

M240G Medium Machine Gun



Manufacturer: Fabrique Nationale Manufacturing, Inc.
Length: 47.5 inches (120.65 centimeters)
Weight: 24.2 pounds (10.99 kilograms)
Bore diameter: 7.62mm (.308 inches)
Maximum effective range: 1.1 miles (1.8 kilometers) on tripod mount
Maximum range: 2.31 miles (3.725 kilometers)
Rates of fire:
Cyclic: 650-950 rounds per minute
Rapid: 200 rounds per minute
Sustained: 100 rounds per minute
Unit Replacement Cost: $6,600

Features: The M240G Machine Gun is the ground version of the original M240/M240E1, 7.62mm medium class weapon designed as a coaxial/pintle mounted machine gun for tanks and light armored vehicles. The rate of fire may be controlled by three different regulator settings. The M240G is modified for ground use by the installation of an "infantry modification kit," comprised of a flash suppressor, front sight, carrying handle for the barrel, a buttstock, infantry length pistol grip, bipod, and rear sight assembly.
While possessing many of the same basic characteristics as the M60 series medium class machine guns, the durability of the M240 system results in superior reliability and maintainability when compared to the M60.

Background: The Marine Corps is replacing the M60E3 with the M240G. The ground version of the M240 allows for a common medium machine gun throughout the Marine Corps.

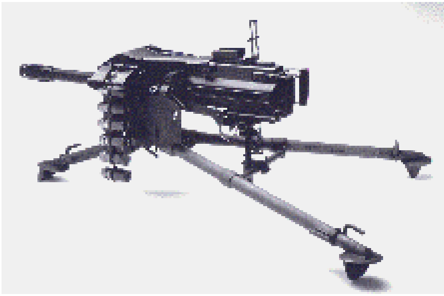
M2 .50 Caliber Machine Gun

Builder: Saco Defense
Length: 61.42 inches (156 centimeters)
Weight:
Gun: 84 pounds (38 kilograms)
M3 Tripod (Complete): 44 pounds (19.98 kilograms)
Total: 128 pounds (58 kilograms)
Bore diameter: .50 inches (12.7mm)
Maximum effective range: 2000 meters with tripod mount
Maximum range: 4.22 miles (6.8 kilometers)
Cyclic rate of fire: 550 rounds per minute
Unit Replacement Cost: $14,002

Features: The Browning M2 .50 Caliber Machine Gun, Heavy barrel is an automatic, recoil operated, air-cooled machine gun with adjustable headspace and is crew transportable with limited amounts of ammunition over short distances. By repositioning some of the component parts, ammunition may be fed from either the left or right side. A disintegrating metallic link-belt is used to feed the ammunition into the weapon. This gun is has a back plate with spade grips, trigger, and bolt latch release. This gun may be mounted on ground mounts and most vehicles as an anti-personnel and anti-aircraft weapon. The gun is equipped with leaf-type rear sight, flash suppressor and a spare barrel assembly. Associated components are the M63 antiaircraft mount and the M3 tripod mount.

Background: Numerous manufacturers originally produced the M2 Heavy Machine Gun.

MK19 40mm Machine Gun, MOD 3



Manufacturer: Saco Defense Industries
Length: 43.1 inches (109.47 centimeters)
Weight:
Gun: 72.5 pounds (32.92 kilograms)
Cradle (MK64 Mod 5): 21.0 pounds (9.53 kilograms)
Tripod: 44.0 pounds (19.98 kilograms)
Total: 137.5 pounds (62.43 kilograms)
Muzzle velocity: 790 feet (240.69 meters) per second
Bore diameter: 40mm
Maximum range: 2200 meters
Maximum effective range: 1600 meters
Rates of fire:
Cyclic: 325-375 rounds per minute
Rapid: 60 rounds per minute
Sustained: 40 rounds per minute
Unit Replacement Cost: $13,758

Features: The MK19 40mm machine gun, MOD 3 is an air-cooled, disintegrating metallic link-belt fed, blowback operated, fully automatic weapon and is crew transportable over short distances with limited amounts of ammunition. It can fire a variety of 40mm grenades. The M430 HEDP 40mm grenade will pierce armor up to 2 inches thick, and will produce fragments to kill personnel within 5 meters and wound personnel within 15 meters of the point of impact. Associated components are: MK64 Cradle Mount, MOD 5; M3 Tripod Mount; and the AN/TVS-5 Night Vision Sight. The MK19 also mounts in the up-gunned weapons station of the LVTP7A1 model of the AAV and vehicle ring mounts.

Background: The MK19 was originally developed to provide the U.S. Navy with an effective riverine patrol weapon in Vietnam. A Product Improvement Program was initiated in the late 1970s resulting in the MK19 Mod 3.

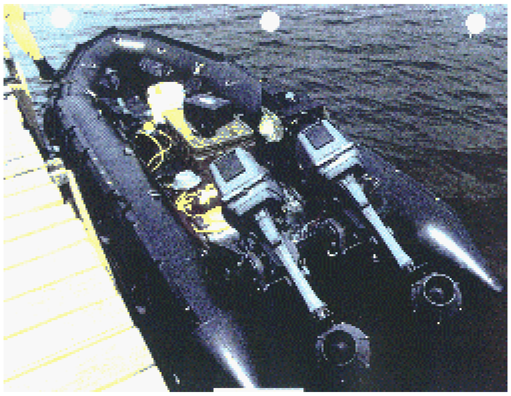
M82A1A .50 Caliber Special Application Scoped Rifle

Manufacturers: Barrett Firearms Manufacturing, Inc. and Unertl
Length: 57 inches (144.78 centimeters)
Barrel length: 29 inches (73.67 cm)
Weight: 32.5 pounds (14.75 kilograms) (unloaded)
Bore diameter: 12.7mm (.50 Caliber)
Maximum effective range on equipment-sized targets: 1800 meters
Muzzle velocity: 2800 feet (854 meters) per second
Magazine capacity: 10 rounds
Unit Replacement Cost: $6,000

Features: The M82A1A is a semi-automatic, air cooled, box magazine fed rifle chambered for the .50 caliber, M2 Browning Machine Gun cartridge (.50 BMG or 12.7 x 99mm NATO). This rifle operates by means of the short recoil principle. The weapon system is comprised of the rifle (M82A1A) with a Unertl 10-power scope and an additional box magazine. The system comes packed in its own watertight, airtight carrying case with an air release valve for aircraft transportation and the requisite cleaning rod and brushes. The basic M82A1A rifle is equipped with bipod, muzzle brake, carrying handle, metallic sights, and 10-round box magazine. There is also a back pack for cross country transport and a bandolier for extra magazines is available.

Background: The M82A1A is designed to provide commanders the tactical option of employing snipers with an anti-materiel weapon to augment the present anti-personnel M40A1 7.62mm weapon. The rifle is manufactured by Barrett Firearms Manufacturing, Incorporated of Murfreesboro, Tennessee. The scope is manufactured by Unertl to match the trajectory of .50 caliber Raufoss Grade A (DODIC A606), which is the standard operational round.

Combat Rubber Reconnaissance Craft (CRRC)



Primary function: A standard small, lightweight, inflatable, rugged boat to be used in performing various reconnaissance missions.
Operational configurations
Length: 185 in.
Width: 75 in.
Height: 30 in.
Weight: 265 lbs.
Storage/Shipping configurations
Length: 59 in.
Width: 28.5 in.
Height: 24 in.
Weight: 265 lbs.
Power requirements: Improved Military Amphibious Reconnaissance System (I-MARS) 35 horsepower engine.
Unit Replacement Cost: $10,700

Background: The CRRC was fielded to fill the Marine Corps' requirement for a small, lightweight, inflatable, rugged boat for use in performing various raid, reconnaissance, and riverine missions. It will replace all other small rubber inflatable boats in the Marine Corps inventory.

Inventory: Active - 407; Reserve – 27

M-9 Armored Combat Earthmover (ACE)

Primary Function: Combat Engineer Tasks
Manufacturer: United Defense LP York, PA.
Weight (Net): 36,000 lbs.
Weight (with ballast): 54,000 lbs.
Length: 246 in.
Height: 105 in.
Width: 126 in**.**
Air Transportable: C-130, C141B, C5A
Speed (Max): 30 mph
Cruising Range: 200 mi.
Water Speed: 3 mph
Unit Cost: $710,194

Features: The M-9 Armored Combat Earthmover is a highly mobile, full-tracked, air transportable armored earthmover and represents a significant enhancement to the combat engineers' capability to support the MAGTF. The M-9 ACE can be employed in a host of engineer tasks, such as clearing obstacles, preparing defilade and survivability positions, and a myriad of engineering construction tasks including dozing, scraping, grading, hauling, towing, and winching. With the combination of its cross-country mobility and armored protection, the M-9 ACE is capable of both offensive and defensive operations in the forwarded battle area. Additionally, with a cruising range of 200 miles, air transportability, and the ability to swim, the M-9 ACE can maintain the momentum of the maneuvering forces.

Inventory: 87

Background: The M-9 ACE is currently in production and is in the process of being fielded to the FMF. Fielding for I MEF units (7th ESB and 1st CEB) and the EEAP at the MCAGCC, Twenty-nine Palms was completed in Jul-Aug 1995. Fielding for the II MEF units (8th ESB and 2d CEB) was completed in Sep 1995. Fielding of the M-9 ACE to the remaining units designated to receive this vehicle, including MARRESFOR units, III MEF units, and the Marine Corps Engineer School at Fort Leonard Wood, is scheduled for the first and second quarters of Fiscal Year 1996.

AAV (Amphibious Assault Vehicle)

LCAC (Landing Craft Air Cushion)

LCU (Landing Craft Utility)

HMMWVS

LAV

M1A1 Tank

M-198 Towed Howitzer

APPENDIX H

MEU ACTIVITY EXPENDABLES

GROUND ORDNANCE — **Mission Use Activity**

DODIC	NOMENCLATURE	SACEX	Live Fire & Manvr	Insert R&S	Helo Raid	Small Boat Raid	Mech Raid - Wet	Mech Raid - Dry	MEU Landing	Direct Action	Amphib Land Rehear	Hwy Xing	ACE Ops	RGR	Withdraw	Eglin Range TOTAL	PTP TOTAL
A024	12 GA LOCKBUSTER		25							25						25	306
A059	5.56MM BALL		54,000								N	N	N	N	N	54,000	387,320
A063	5.56MM TRACER	500	3,000								O	O	O	O	O	3,500	12,990
A064	5.56MM 4&1 LINKED, F/SAW	2,000	25,000								N	N	N	N	N	27,000	196,010
A075	CTG 5.56mm, BLNK LNKD				12,000	12,000	12,000	12,000	12,000		E	E	E	E	E	24,000	80,200
A080	CTG 5.56mm, BLNK SNGL Rd			500	12,360	12,360	12,360	12,360	12,360							27,360	117,360
A111	CTG 7.62MM BLANK LINKED			1,000	9,200	9,200	9,200	9,200	9,200							12,800	70,700
A131	CTG 7.62MM LINKED 4&1	2,000	15,000													17,000	220,300
A363	9MM BALL		6,000													6,000	50,000
A475	CAL .45 BALL		1,500							8,500						10,000	130,000
A576	CTG CAL .50 4&1 LINKED, F/M2		12,000													12,000	51,900
A598	CTG CAL .50 BLANK LINKED, F/M2		300													300	600
A606	CTG CAL .50, API		100							10						110	950
A976	CTG 25MM, TP-T, M793, LINKED		1,000													1,000	2,000
AA11	7.62MM BALL L/R		2,000													2,000	10,000
AA12	CTG 9MM RED MARKING		4,000													4,000	
AA21	CTG 9MM BLUE MARKING		6,000													6,000	
AA40	5.56MM FRANGIBLE									11,000						11,000	27,500
AX11	CTG 9MM, SPOTTING RIFLE (SMAW)		800													800	1,800
AX14	12 GA PRIMERS		60													60	222
DWBS	CHG DIVERSIONARY		260							20						280	780
B519	CTG 40MM, PRACTICE, M781		300													300	4,380
B542	CTG 40MM, LINKED, HE DP F/MK19		5,000													5,000	11,124
B546	CTG 40MM, HE DP, M433		500													500	1,133
B584	CTG 40MM, PRACTICE, LINKED		5,000													5,000	15,732
B643	CTG 60MM HE	400	100													500	600
B647/B627	CTG 60MM ILLUMINATION	50	25													75	150
C784	CTG 120MM TP-T		40													40	80
C785	CTG 120MM TPCSDS-T		60													60	120
C870	CTG 81MM, SMOKE RP, M819A1	150	50													200	200

GROUND ORDNANCE — Mission Use Activity

DODIC	NOMENCLATURE	SACEX	Live Fire & Manvr	Insert R&S	Helo Raid	Small Boat Raid	Mech Raid - Wet	Mech Raid - Dry	MEU Landing	Direct Action	Amphib Land Rehear	Hwy Xing	ACE Ops	RGR	Withdraw	Eglin Range TOTAL	PTP TOTAL
C871	CTG 81MM, ILLUM, M853A1	150	50													200	410
C868	CTG 81MM HE	700	100													800	500
C995	ROCKET 83MM AT-4		12													12	81
D505	155MM ILLUM, M485A2	200														200	130
D529	155MM HE	500														500	575
D540	CHG PROP GREEN BAG M3	700														700	
G878	FUZE, DELAY, F/G811 PRAC GREN		300													300	2,535
G881	GRENADE, HAND, FRAG, M67		200													200	1,095
G940	GRENADE, HAND SMOKE GREEN	12			8	8	8	8	8							48	226
G945	GRENADE, HAND SMOKE YELLOW	12			8	8	8	8	8							48	250
G950	GRENADE, HAND SMOKE RED	4	2		2	2	2	2	2							12	25
G982/G930	GRENADE, HAND SMOKE (HC) TA	12			8	8	8	8	8							48	174
HX05	RKT 83MM, ASSAULT, SMAW		10													10	45
HX07	RKT 83MM, COMMON PRACTICE		10													10	45
L306	SIGNAL, RED STAR CLUSTER	4	2		2	2	2	2	2	1						12	75

PYROTECHNICS

Mission Use Activity

DODIC	NOMENCLATURE	SACEX	Live Fire & Manvr	Insert R&S	Helo Raid	Small Boat Raid	Mech Raid - Wet	Mech Raid - Dry	MEU Landing	Direct Action	Amphib Land Rehear	Hwy Xing	ACE Ops	RGR	Withdraw	Eglin Range TOTAL	PTP TOTAL
L307	SIGNAL, WHITE STAR CLUSTER	12	24		6	6	6	6	6	2						96	241
L311	SIGNAL, RED STAR PARACHUTE	4	4		2	2	2	2	2	1						12	25
L312	SIGNAL, WHITE STAR PARACHUTE	12	24		6	6	6	6	6	2						96	358
L314	SIGNAL, GRN STR CLUSTER	12	24		6	6	6	6	6	2						96	225
L323	SIGNAL, RED PARACHUTE	2	4		2	2	2	2	2	1						12	25
L324	SIGNAL, GRN PARACHUTE	12	24		12	12	12	12	12	2						96	151
L367	SIMULATOR, AT GM AND RKT, M22		100													100	300
L495	FLARE, SURFACE, TRIP				12	12	12	12	12							60	197
L592	SIMULATOR, BLAST, TOW		25													25	175
L594	SIMULATOR, PROJ GROUND BLAST				4	4	4	4	4							24	42
L598	SIMULATOR, FLASH, BOOBYTRAP			4	12	12	12	12	12							96	775
L599	SIMULATOR, FILLUM, BOOBYTRAP			4	12	12	12	12	12							96	890
L602	SIMULATOR, FLASH, ARTY, M21				4	4	4	4	4							10	20
LX21	SIMULATOR, NOISE, (SMAW)		24													24	114
MO28	DEMO KIT, BANGALORE TORPEDO		6													6	18
M030	CHG, DEMO, 1/4 LB BLOCK TNT		100													100	750
M032	CHG, DEMO, 1 LB BLOCK TNT		100													100	548
M130	ELECT BLASTING CAP		100													100	1,055
M131	NON ELECT BLASTING CAP		100													100	1,156
M420	CHG, DEMO, SHAPED, 15LB		2													2	18
M421	CHG, DEMO, SHAPED, 40LB		2													2	12
M456	DET CORD, 50 GR		300FT													300	13,700
M670	FUSE, BLASTING, TIME		100													100	8,490
M766	M60 FUSE IGNITORS		100													100	1,178
M981	CHG EXPL SHEET, C-3		7FT													7	250

PYROTECHNICS — **Mission Use Activity**

DODIC	NOMENCLATURE	SACEX	Live Fire & Manvr	Insert R&S	Helo Raid	Small Boat Raid	Mech Raid - Wet	Mech Raid - Dry	MEU Landing	Direct Action	Amphib Land Rehear	Hwy Xing	ACE Ops	RGR	Withdraw	Eglin Range TOTAL	PTP TOTAL
ML03	FIRING, DEVICE MP		40													40	62
MM30	CHG 20 GRAM BOOSTER		20													20	69
MM56	DET PERCUSSION, NON-ELEC		20													20	300
MU40	DET CORD, 400 GR		10													10	33
MU42	DET CORD, 100 GR		100													100	71
N289/N285	FUZE ET M762 W/O BOOSTER	200														200	
N340	FUZE PD M739A1	500														500	
N523	PRIMER, PERCUSSION, M82	730														730	
PB99	GUIDED MISSILE TOW PRAC		2													2	4
WF10	GUIDED MISSILE TOW		2													2	4

N.E.W. = Net Explosive Weight
QTY = quantity (all quantities are listed as a unit of issue of "each" unless specified

AVIATION ORDNANCE				Mission Use Activity													
DODIC	NOMENCLATURE	SACEX	Live Fire & Manvr	Insert R&S	Helo Raid	Small Boat Raid	Mech Raid - Wet	Mech Raid - Dry	MEU Landing	Direct Action	Amphib Land Rehear	Hwy Xing	ACE Ops	RGR	R/W TOTAL	F/W TOTAL	PTP TOTAL
A131	7.62MM B&T F/M60/240	3,000	3,200												6,200	0	
A165	7.62MM B&T F/GAU	6,316	10,000												16,316	0	
A555	.50 CAL BALL	1,103													1,103	0	
A557	.50 CAL LKD B&T	3,988													3,988	0	
A576	.50 CAL LKD API	7,500													7,500	0	
A772	20MM TP	3,268	2,282												5,550	0	
A762/919	20MM SAPHEI	485													485	0	
A978	25MM TP, PGU-73	1,000													0	1,000	
BWBG	LGTR (Laser Guided Trng Rd)		4												0	4	
E973	BOMB, PRACT MK-76	50													0	50	126
E470	BOMB, MK-82	24													0	24	250
E510	BOMB, MK-83, GP	12													0	12	100
E511	BOMB, MK-83, INERT	12							NO AMMO USED FOR THESE EVENTS						0	12	100
F278	BOMB, MK-84, GP MOD6	6													0	6	
F562	MK-4, CTG SIGNAL	130													0	130	
H663	WHD, 2.75" INERT	12	12												24	0	200
H812	WHD, 2.75" ILLUM	7													7	0	
H842	WHD, 2.75" HE ***	3													3	0	
H855	WHD, 2.75" WP ***	3													3	0	
H930	WHD, 5.00" HE	20													20	0	
HA07	RKT MTR, 2.75" MK66	36	14												50	0	213
J270	RKT MTR CLUSTER, 5.0"	20													20	0	
L540	FLARE SIMLTR	14													14	0	
LA02	FLARE DECOY MJU-38/B ***	4													0	4	
LW60	FLARE,DECOY	59													59	0	
MF29	CCU-63 IMP CTG	211													211	0	
MT95	CCU-107/B IMP CTG	130													0	130	
NW20	RR 129 CHAFF	138													138	0	
PC91	AGM-144B HELLFIRE	4													4	0	
PU16	BGM-71E TOWII	4													4	0	
SS36	FTG IMP F/ CHAFF & FLARES	4													0	4	

R/W = Rotary Wing aircraft (UH-1N, AH-1W, CH-53E, CH46E)
F/W = Fixed Wing aircraft (AV-8B)

GROUND ORDNANCE

DODIC	NOMENCLATURE	HAZ CLS	ITEM N.E.W.
A024	12 GA LOCKBUSTER	1.4S	0.0031
A059	5.56MM BALL	1.4S	0.0038
A063	5.56MM TRACER	1.4S	0.0036
A064	5.56MM 4&1 LINKED, F/SAW	1.4S	0.0085
A075	CTG 5.56mm, BLNK LNKD	1.4S	0.0011
A080	CTG 5.56mm, BLNK SNGL Rd	1.4S	0.0016
A111	CTG 7.62MM BLANK LINKED	1.4S	0.0025
A131	CTG 7.62MM LINKED 4&1	1.4S	0.0079
A363	9MM BALL	1.4S	0.0009
A475	CAL .45 BALL	1.4S	0.0008
A576	CTG CAL .50 4&1 LINKED, F/M2	1.4G	0.0336
A598	CTG CAL .50 BLANK LINKED, F/M2	1.4G	0.0069
A606	CTG CAL .50, API	1.4G	0.0394
A976	CTG 25MM, TP-T, M793, LINKED	1.4C	0.2205
AA11	7.62MM BALL L/R	1.4S	0.0063
AA12	CTG 9MM RED MARKING	1.4S	0.0004
AA21	CTG 9MM BLUE MARKING	1.4S	0.0004
AA40	5.56MM FRANGIBLE	1.4S	0.0036
AX11	CTG 9MM, SPOTTING RIFLE (SMAW)	1.4S	0.0007
AX14	12 GA PRIMERS	1.4S	0.0001
DWBS	CHG DIVERSIONARY	1.2G	0.0420
B519	CTG 40MM, PRACTICE, M781	1.4C	0.0008
B542	CTG 40MM, LINKED, HE DP F/MK19	1.1E	0.0942
B546	CTG 40MM, HE DP, M433	1.1E	0.1018
B584	CTG 40MM, PRACTICE, LINKED	1.4C	0.0128
B643	CTG 60MM HE	1.2E	0.9004
B647/B627	CTG 60MM ILLUMINATION	1.2G	0.6800
C784	CTG 120MM TP-T	1.3C	12.1000
C785	CTG 120MM TPCSDS-T	1.3C	16.1506
C870	CTG 81MM, SMOKE RP, M819A1	1.3G	2.9801
C871	CTG 81MM, ILLUM, M853A1	1.3G	1.8679
C868	CTG 81MM HE	1.2E	2.0578
C995	ROCKET 83MM AT-4	1.1E	1.8400
D505	155MM ILLUM, M485A2	1.3G	6.1230
D529	155MM HE	1.1D	23.8000
D540	CHG PROP GREEN BAG M3	1.3C	5.8170
G878	FUZE, DELAY, F/G811 PRAC GREN	1.4B	0.0045
G881	GRENADE, HAND, FRAG, M67	1.1F	0.3720
G940	GRENADE, HAND SMOKE GREEN	1.4G	0.7200
G945	GRENADE, HAND SMOKE YELLOW	1.4G	0.7219
G950	GRENADE, HAND SMOKE RED	1.4G	0.7200
G982/G930	GRENADE, HAND SMOKE (HC) TA	1.4G	1.2000
HX05	RKT 83MM, ASSAULT, SMAW	1.1E	0.9632
HX07	RKT 83MM, COMMON PRACTICE	1.1C	0.9070
L306	SIGNAL, RED STAR CLUSTER	1.3G	0.2809

GROUND ORDNANCE

DODIC	NOMENCLATURE	HAZ CLS	ITEM N.E.W.
L307	SIGNAL, WHITE STAR CLUSTER	1.3G	0.3200
L311	SIGNAL, RED STAR PARACHUTE	1.3G	0.2900
L312	SIGNAL, WHITE STAR PARACHUTE	1.3G	0.2827
L314	SIGNAL, GRN STR CLUSTER	1.3G	1.6690
L323	SIGNAL, RED PARACHUTE	1.3G	0.2193
L324	SIGNAL, GRN PARACHUTE	1.3G	0.2193
L367	SIMULATOR, AT GM AND RKT, M22	1.3G	0.0325
L495	FLARE, SURFACE, TRIP	1.3G	1.0811
L592	SIMULATOR, BLAST, TOW	1.1G	0.0066
L594	SIMULATOR, PROJ GOUND BLAST	1.2G	0.1410
L598	SIMULATOR, FLASH, BOOBYTRAP	1.3G	0.1875
L599	SIMULATOR, FILLUM, BOOBYTRAP	1.3G	0.0134
L602	SIMULATOR, FLASH, ARTY, M21	1.3G	0.0938
LX21	SIMULATOR, NOISE, (SMAW)		
MO28	DEMO KIT, BANGALORE TORPEDO	1.1D	107.2000
M030	CHG, DEMO, 1/4 LB BLOCK TNT	1.1D	0.5000
M032	CHG, DEMO, 1 LB BLOCK TNT	1.1D	1.0000
M130	ELECT BLASTING CAP	1.1B	0.0029
M131	NON ELECT BLASTING CAP	1.1B	0.0028
M420	CHG, DEMO, SHAPED, 15LB	1.1D	11.5000
M421	CHG, DEMO, SHAPED, 40LB	1.1D	30.0000
M456	DET CORD, 50 GR	1.1D	7.0000
M670	FUSE, BLASTING, TIME	1.4S	0.0027
M766	M60 FUSE IGNITORS	1.4S	0.0001
M981	CHG EXPL SHEET, C-3, 25FT	1.1D	20.0000
ML03	FIRING, DEVICE MP	1.4S	0.0001
MM30	CHG 20 GRAM BOOSTER	1.1D	0.0440
MM56	DET PERCUSSION, NON-ELEC	1.4S	0.0088
MU40	DET CORD, 400 GR	1.1D	0.0572
MU42	DET CORD, 100 GR	1.1D	0.0143
N289/N285	FUZE ET M762 W/O BOOSTER	1.4S	0.0006
N340	FUZE PD M739A1	1.2D	0.0480
N523	PRIMER, PERCUSSION, M82	1.4S	0.0031
PB99	GUIDED MISSILE TOW PRAC	1.1C	5.7000
WF10	GUIDED MISSILE TOW	1.1E	12.4500

N.E.W. = Net Explosive Weight
QTY = quantity (all quantities are listed as a unit of issue of "each" unless specified

AVIATION ORDNANCE

NALC	NOMENCLATURE	HAZ CLS	ITEM N.E.W.
A131	7.62MM B&T F/M60/240	1.4S	0.0079
A165	7.62MM B&T F/GAU	1.4S	0.0067
A555	.50 CAL BALL	1.4C	0.0342
A557	.50 CAL LKD B&T	1.4C	0.0374
A576	.50 CAL LKD API	1.4G	0.0336
A772	20MM TP	1.4C	0.0000
A762/919	20MM SAPHEI	1.2E	0.1150
A978	25MM TP, PGU-73	1.4C	0.2095
BWBG	LGTR (Laser Guided Trng Rd)		
E973	BOMB, PRACT MK-76		
E470	BOMB, MK-82	1.1D	180.0000
E510	BOMB, MK-83, GP	1.1D	375.0000
E511	BOMB, MK-83, INERT		
F278	BOMB, MK-84, GP MOD6	1.1D	970.0000
F562	MK-4, CTG SIGNAL	1.4G	0.0602
H663	WHD, 2.75" INERT	1.2G	7.2640
H812	WHD, 2.75" ILLUM	1.3G	5.5120
H842	WHD, 2.75" HE ***	1.1D	2.4000
H855	WHD, 2.75" WP ***	1.2H	2.3000
H930	WHD, 5.00" HE	1.1D	15.3000
HA07	RKT MTR, 2.75" MK66	1.2G	7.2141
J270	RKT MTR CLUSTER, 5.0"	1.3C	35.1270
L540	FLARE SIMLTR		
LA02	FLARE DECOY MJU-38/B ***		
LW60	FLARE,DECOY		
MF29	CCU-63 IMP CTG		
MT95	CCU-107/B IMP CTG		
NW20	RR 129 CHAFF		
PC91	AGM-144B HELLFIRE	1.1E	34.4000
PU16	BGM-71E TOWII	1.1E	15.3390
SS36	FTG IMP F/ CHAFF & FLARES		

APPENDIX I

TOXICOLOGY INFORMATION AND PARAMETERS FOR ANALYSIS

Table I-1. Environmental Fate and Transport of Common Munition/UXO Chemicals

Chemical	Environmental Fate and Transport Potential
Organics	
HMX	HMX that is released to air can be carried by the wind for some distances. Once dispersed onto soils it is likely to migrate to groundwater, particularly in sandy soils (ATSDR, 1997). Photolysis is the dominant breakdown mechanism. The time for half of the contaminant to break down (half-life) has been estimated at 17 days in river water and 7,900 days in lagoon water with little sunlight (ATSDR, 1997). HMX does not evaporate or readily bind to sediments.
Nitroglycerine	Nitroglycerine may be released to the environment in wastewater from its production and use as a component of propellants and explosives and as a pharmaceutical. If released on land, it should leach into the ground where its fate is unknown. If released into water, it will most likely biodegrade; however, data concerning its biodegradation in environmental waters are lacking. Adsorption to sediment and bioconcentration in fish should not be significant. Releases into the atmosphere should be as an aerosol and it should be subject to gravitational settling and scouring by rain (TOXNET, 2003).
RDX	RDX will be moderate to highly mobile in soil and will break down (biodegrade) under anaerobic conditions, exhibiting a half-life of 12 days. It remains resistant to degradation when exposed to air (aerobic). If released to the atmosphere, RDX will exist as particulate and ultimately be removed by dry deposition. In water, RDX exhibits direct photochemical breakdown, as it does in the atmosphere.
TNT	TNT does not readily hydrolyze or volatilize from water under normal environmental conditions. It migrates slowly through soil and binds to sediments and particulates in the water column. Studies have shown that photochemical reactions of TNT may play an important role in surface soil and water degradation. Microbial degradation showed longer half-lives than photolysis. The half-life was 3 to 4 days in sediment exposed to sunlight and 19 to 25 days when undergoing microbial degradation (TOXNET, 2003).
Metals	
Aluminum	Aluminum occurs naturally in soil, water and cannot be broken down in the environment. Wind-borne particles settle to the ground or are washed out of the air by rain. Aluminum in soil is taken up into plants; however, it not known to bioconcentrate in the food chain. An exception is tea plants, which can accumulate aluminum. Most aluminum-containing compounds do not dissolve in water unless the water is acidic. When acid rain falls, aluminum compounds in the soil may dissolve and enter lakes and streams. Since the affected bodies of water are often acidic themselves from the acid rain, the dissolved aluminum does not combine with other elements in the water and settle out as it would under normal (i.e., non-acidic) conditions (ATSDR, 1999).
Copper	Copper is found naturally in the environment. The majority of copper released to soils becomes bound to soils or organic matter. The ability of copper to leach from soils is dependent upon the acidic content of rainfall through the soil (ATSDR, 1990). One study showed that copper became mobile only following rainfall that was acidic at a pH of <3. Thus the primary transport pathway of copper would be from leaching through the acidic to slightly acidic permeable sand of Lackland soils.
Lead	Lead oxidizes when exposed to air and dissolves when exposed to acidic water and soil. Lead bullets, bullet particles, or dissolved lead can be moved by stormwater runoff and dissolved lead can migrate through soils to the groundwater. The primary cause of lead mobilization from ammunition is from metallic lead to form Pb^{+2} (dissolved from the crust of ammunition) and a combination of oxidized compounds. Acidic soils tend to increase lead oxidation and dissolution (ATSDR, 1999a). Soils on Eglin are extremely low in clay (sandy), organic matter, iron and aluminum oxides, and are acidic, which are all conditions that are favorable to lead mobility and leachability. Lead had been shown to bioaccumulate in animals (ATSDR, 1999a).
Manganese	Manganese and manganese compounds exist naturally in the environment as solids in soil and as small particles in water. Algae and plankton in the water can consume some manganese and concentrate it within themselves. Manganese from human-made sources can enter surface water, groundwater, and sewage waters. Small manganese particles can also be picked up by water flowing through landfills and soil. The chemical state of manganese and the type of soil determines how fast it moves through the soil or how much is retained (ATSDR, 2000).

Table I-1. Environmental Fate and Transport of Common Munition/UXO Chemicals Cont'd

Chemical	Environmental Fate and Transport Potential
Metals Cont'd	
Zinc	Zinc is not found in free form in nature but rather occurs as zinc sulfide or zinc oxide. As with copper, zinc can enter the Eglin environment from corrosion of brass weaponry or small arms. When released to the air it can bind to soil, sediments, and dust particles. Zinc ions and zinc complexes can migrate to groundwater and move to surface waters. Most of the zinc in soils stays bound to soil particles. Neutral soils between pH of 6 and 7 reduce the availability of zinc to soils. Zinc has been shown to bioaccumulate in fish and other organisms; however, it does not bioaccumulate in plants (ATSDR, 1995).

Table I-2. Human and Ecological Health Effects of Typical Munitions Residue

Chemical	Carcinogenicity Class*	Human	Ecological
HMX	D-Not classifiable	Information on adverse effects is limited. One study reported no adverse effects in workers occupationally exposed to HMX, but data regarding concentrations were not available. It is not known if exposure can affect the ability to have children or whether or not it can cause birth defects (ATSDR, 1997).	Limited studies show HMX has low oral acute toxicity but widespread interspecies variation. Studies with mice, rats, and rabbits show adverse effects to the liver, kidney, and blood systems (IRIS, 2002). Avian studies with northern bobwhite revealed that quail could ingest significant doses of HMX (125-2,125 mg/kg) with no acute toxicity. An ongoing subchronic study reveals no adverse effects to birds from exposures up to 10,000 g/kg, suggesting that HMX is largely not available for absorption to birds. Generally, no effects of exposure to 32 mg/L were observed in any of the algae or invertebrate species tested (TOXNET, 2003).
Nitroglycerine	D-Not classifiable	Toxic effects may occur by ingestion, inhalation of dust, or absorption through skin. May cause dilation of blood vessels and drop in blood pressure. Chronic exposure may cause severe headache, hallucinations, and skin rashes. Acute poisoning, occurring especially in industrial workers, caused nausea, vomiting, abdominal cramps, headache, mental confusion, delirium, bradycardia, paralysis, convulsions, circulatory collapse, and death (TOXNET, 2003).	Animals given effective doses by mouth exhibited marked depression in blood pressure, tremors, ataxia, lethargy, alteration in respiration, cyanosis, convulsions, and death. The lethal concentration to kill 50% (LC_{50}) bluegill is 1.28 mg/L/96 hr @ pH 6.0 in a static bioassay (TOXNET, 2003).
RDX	C-Possible Human Carcinogen	Occupational exposure has caused toxic effects to the central nervous system to include tonic/clonic seizures. Chronic exposure caused convulsions, headache, nausea, vomiting, and unconsciousness. Based on laboratory animal studies showing development of liver tumors, it is thought that RDX may cause cancer in humans.	Laboratory studies with mice revealed the central nervous system, kidney, liver, spleen, heart, eyes, and testicles. Freshwater fish are more susceptible to RDX than invertebrates. The lethal LC_{50} of the fish ranged from 4.1 to 13 mg/L depending on the test system (IRIS, 2002). Studies of the northern bobwhite quail established a no observable adverse effect level (NOAEL) of 8.7 mg/kg and lowest observable effect level (LOAEL) of 10.6 mg/kg. Effects to blood, spleen, and egg production were noted (USCHPPM, 2002).
TNT	C-Possible Human Carcinogen	Human health effects have been recorded from workers involved in the production of TNT at their jobs. Harmful effects include disorders of the blood, such as anemia and abnormal liver function. Prolonged exposure to the skin can cause allergic reactions, itching, and rashes. Long-term exposure to TNT has caused cataracts in some individuals. Based on laboratory animal studies showing urinary bladder tumors, TNT had the potential to be a possible human carcinogen.	Studies with rats, mice, and dogs showed effects to the male reproductive system, heart, blood, and urinary bladder. Studies with the northern bobwhite quail showed an acute lethal dose of 2,003 mg/kg. Adverse effects were seen in the blood cells, liver, urine, and heart (Gogal et al., 2002). Fathead minnow showed behavioral effects when exposed to 0.46 mg/L TNT. In a laboratory microcosm study using daphnid, zooplankton, worms, and algae, exposures of 21 days at $\geq$ 5.6 mg/L produced reductions in daphnid and worms. Exposure of TNT at concentrations of 0.24 to 1.69 mg/L for 60 days reduced fish fry survival, and concentrations of 0.04 to 0.5 mg/L reduced length and weight of fry (TOXNET, 2003).

Table I-2. Human and Ecological Health Effects of Typical Munitions Residue Cont'd

Chemical	Carcinogenicity Class*	Human	Ecological
Aluminum	D-Not classifiable	Low-level exposure to aluminum from food, air, water, or contact with skin is not thought to harm health. People who are exposed to high levels of aluminum in air may have respiratory problems including coughing and asthma from breathing dust. Some studies show that people with Alzheimer's disease have higher levels of aluminum in their brains. Infants and adults who received large doses of aluminum developed bone diseases (ATSDR, 1999).	Laboratory studies with rats and rabbits showed that aluminum dust caused adverse effects to the respiratory system, spleen, kidneys, and blood vessels. Ingestion of 1,400 mg/kg showed effects to blood and bone. Chickens developed rickets (TOXNET, 2003).
Copper	D-Not classifiable	Copper is essential to human health, but ingesting gram doses of copper salts has resulted in gastrointestinal, liver, and bladder effects. Gastrointestinal disturbance and liver toxicity have resulted in long-term exposure to drinking water containing 2.2-7.8 mg/L. Workers exposed to copper dust experienced gastrointestinal problems, headaches, and vertigo (ATSDR, 1990).	In laboratory studies, animals exposed to copper showed liver and kidney death at doses > 100 mg/kg/day. Copper has been shown to be poisonous to terrestrial organisms in soil (e.g., earthworms). Extensive use of copper containing fungicides in orchards has been known to eradicate soil organisms (TOXNET, 2003). Copper sulfate is fairly non-toxic to birds with the lowest lethal dose shown at 1,000 mg/kg in pigeons and 600 mg/kg in ducks. However, it is highly toxic to fish and has been lethal to trout even at recommended applications. Copper is acutely toxic to a variety of freshwater species ranging from sensitivities of 17.74 µg/L for pike minnow species to 10,240 µg/L for stonefly species (USEPA, 1986).
Lead	B2-Probable Human Carcinogen	Lead and lead compounds are highly toxic to humans, particularly children. Lead can accumulate in the body over time. Overexposure can lead to short- or long-term effects on a wide variety of body systems. Long-term exposure can lead to adverse effects to the nervous, cardiovascular, gastrointestinal, immune, reproductive, and kidney systems. Death had occurred in children exposed to 100 mg/dL and irreversible brain damage at 80 µg/dL. Reproductive effects in adults include an increase in female spontaneous abortion and reductions in male sperm count and morphology (WHO, 1995).	In all species of experimental animals studied, lead has shown adverse effects to several organs and organ systems. Rats had impaired memory/learning abilities when lead blood levels reached 15-20 µg/dL (WHO, 1995). Calves pastured on a target area of a military shooting range showed acute lead poisoning that included symptoms of maniacal movements, drooling, rolling eyes, and convulsions. Most calves died, and blood levels of lead were as high as 940 µg/L. Concentrations of lead in the grass and soil were 29,550 mg/kg and 3,900 mg/kg, respectively (Braun, et al., 1997). Lead shot is highly toxic to birds; ingestion of a single pellet can be fatal to some birds. In the form of simple salts, lead is acutely toxic to freshwater organisms at concentrations above 40 mg/L and for marine organisms above 500 mg/L (WHO, 1989).

Table I-2. Human and Ecological Health Effects of Typical Munitions Residue Cont'd

Chemical	Carcinogenicity Class*	Human	Ecological
Manganese	D-Not Classifiable	Manganese is a trace element and small amounts are needed to stay healthy. Exposure to excess levels of manganese may occur from breathing air, particularly where manganese is used in manufacturing, and from drinking water and eating food. At high levels, it can cause damage to the brain, liver, kidneys, and the developing fetus (ATSDR, 2000).	Studies on the effects of manganese on terrestrial and aquatic biota are minimal. Laboratory studies on animals indicate that manganese given at high oral doses can cause death but when given at large doses with food has not been found to cause significant toxicity over short- or long-term exposures.
Zinc	B2-Probable Human Carcinogen	Zinc is a nutritionally essential element. However, acutely toxic doses (675 to 2,280 µg/L) in drinking water cause nausea, vomiting, diarrhea and abdominal cramps. Gastric bleeding and anemia were seen from individuals taking zinc sulfate (6.47 mg/kg/day) for one week. Ingestion of zinc chloride has caused burning in the mouth and throat, vomiting, pharyngitis, esophagitis, hypocalcemia and pancreatitis. Long-term oral doses have caused anemia (ATSDR, 1995).	The acute toxic effects of zinc have been observed in the field and laboratory. Sheep consuming zinc (dose unknown) as a result of environmental contamination, developed diarrhea, protein in the urine, intestinal and pancreatic lesions, and pancreatic cell degeneration. Ferrets dosed with 850 mg/kg/day showed adverse effects to the kidneys, intestines, and blood. The aquatic toxicity of zinc is dependent upon organism age, size, prior exposure, water hardness, pH, dissolved organic carbon, and temperature. Reported acute toxicity values of dissolved zinc to freshwater and marine organisms are as follows: freshwater invertebrates (0.07 mg/L), water flea (575 mg/L), marine invertebrates (0.097 mg/L), grass shrimp (11.3 mg/L). Acutely lethal concentrations for freshwater fish range from 0.066 to 2.6 mg/L; the range for marine fish is 0.19 to 17.66 mg/L (USEPA, 1980). Zinc has shown adverse reproductive, biochemical, physiological, and behavioral effects on aquatic organisms.

***** Under USEPA's classification of carcinogenicity, a Class A compound is a known carcinogen, a Class B compound is a probable carcinogen, and a Class C compound is a possible carcinogen. A Class D rating means that there is insufficient evidence of carcinogenicity to place the compound in any of the three higher classifications.

mg/kg = milligrams per kilogram   g/kg = grams per kilogram   mg/L = milligrams per liter   mg/dL = milligrams per deciliter   µg/L = micrograms per liter
µg/dL = micrograms per deciliter   hr = hours

Regulatory Guidance

Cleanup or action levels for contaminants in soil are site-specific and depend on several factors, including the characteristics of the soil, the mix of the contaminants, the potential receptor and exposure pathways, and potential for migration to groundwater. The U.S. Environmental Protection Agency (USEPA) has developed risk-based concentrations for a variety of chemicals to protect human health (Table I-3) (Walsh et al., 2001). These concentrations may be used as a first-level screening criteria for potential adverse impacts.

Table I-3. Risk-Based Concentration In Soil for Munitions-Related Chemicals (µg/g)

Chemical	Industrial	Residential
TNT	190	21
RDX	52	5.8
HMX	10,000	3,900
NG	410	46
2,4-DNT	4,100	160
Aluminium	2,000,000	78,000
Copper (Cu)	82,000	3,100
Lead (Pb)	-	-
Manganese	41,000	1,600
Zinc	610,000	23,000

Source: USEPA, 2002
µg/g = micrograms per gram

Table I-4, Drinking Water Criteria For Munitions-Related Chemicals, presents drinking water criteria associated with common munition residues/chemicals. The table may be used an indication of the potential toxicity of munitions-related chemicals on human health. The low acceptable threshold criterion for explosives in drinking water correlate to high toxicity levels for some of these chemicals.

Table I-4. Drinking Water Criteria For Munitions-Related Chemicals

Chemical	Risk-Based Concentration – Tap Water (µg/L, ppb)
TNT	1.0
RDX	2.0
HMX	400
Nitroglycerine	5.0
2,4-DNT	0.17
2,6-DNT	0.0068
1,3,5-TNB	1.0
Aluminum	Secondary Drinking Water Regulations 0.05-0.2
Copper	1.3, Action Level
Lead	0.015, Action Level
Manganese	Secondary Drinking Water Regulations 0.5
Zinc	Not determined

Source: USEPA, 1999; Thiboutot, 2002; USEPA, 2002a
ppb = parts per billion

Although criteria have also been established to protect aquatic and terrestrial biota from metals contamination, standards are lacking for explosive contaminants. Table I-5, Ecological Standards and Benchmarks for Metals in the Environment, lists ecological threshold criteria for metals.

Table I-5. Ecological Standards and Benchmarks for Metals in the Environment

Chemical	Freshwater Water Quality Criteria (μg/L)	Saltwater Water Quality Criteria (μg/L)	Soil Screening Benchmark (mg/kg)	Sediment Screening Benchmark (mg/kg)	Surface Water Benchmark Acute/Chronic (mg/L)
Copper	13	4.8	40	18.7	0.013/0.009
Aluminum	750	No data	50	No data	0.75/0.087
Lead	65	210	30.2	50	0.065/0.0025
Manganese	No data	No data	100	No data	No data
Zinc	120	90	124	50	0.117/0.106

Source: USEPA, 1999

The environmental fate and transport, health effects, and an exposure assessment of the chemical constituents of pyrotechnics are provided in Table I-6.

Installation Restoration Program Sites

Active Installation Restoration Program (IRP) sites, Legacy Debris Pits (LDPs), and Land-Use Control (LUC) areas within 200 meters of the Auxiliary Fields and Landing Zones, or within 50 feet of transportation routes, were identified and are detailed in Table I-7, Installation Restoration Program Sites, and Figures A-67 through A-70 in Appendix A.

Table I-6. Environmental Fate and Transport, Health Effects, and Exposure Assessment for Pyrotechnics

Material	Environmental Fate and Transport	Health Effects	Exposure Assessment
Smokes			
Colored Smoke	This material is used as a ground-to-ground or ground-to-air signaling device, a target-landing zone marking device, or a screening device for unit movements. The filler contains 11.5 ounces of colored smoke mixture (red, green, yellow, violet). The colored smoke lasts for 50 to 90 seconds (U.S. Air Force, 1997). After dissemination, smoke will sorb to soil and sediment, with minimal solubility in surface waters and ground water. The dyes, other than Solvent Yellow-33, are quickly transformed and do not persist in the environment, with half-lives on the order of a few days (U.S. Air Force, 1997).	The major mechanism of exposure to dye colored smoke is via inhalation and dermal contact immediately following dissemination. The dyes are mutagenic in Ames tests and show tendency toward carcinogenicity (causing cancer) and tumor inducement. Inhalation toxicity appears to be minimal, while skin sensitivity appears to be high. Toxicity data indicate that all dyes appear to be mildly toxic by oral and inhalation exposures. Dispersed blue dye has high aquatic toxicity with 96-hour lethal concentrations to 50% exposure (LC_{50}) in fathead minnow of 1.0 mg/L (TOXNET, 2003).	USEPA classifies the colored dyes as carcinogens. However, the use of colored smoke has been assessed, and its use is common during military training activities on Eglin (U.S. Air Force, 1997). No adverse impacts are anticipated if standard safety procedures are followed.
Hexachloroethane (HC) Smoke/Signal Smoke – Smoke Pots and Grenades	HC smoke is a mixture of hexachloroethane, zinc oxide, and aluminum and burns to release a dense white smoke that contains primarily zinc chloride, with small amounts of amorphous carbon, and aluminum oxide. It is assumed that hexachloroethane is entirely consumed and not transported in the smoke cloud (U.S. Air Force, 1997). Zinc chloride vapor released by combustion rapidly condenses to droplets in the atmosphere. It is transported in air and deposited to the ground or surface waters. The chloride ion is prevalent in nature and generally innocuous in the environment. Zinc may adsorb to soil and vegetation where it could be absorbed or ingested by biota.	Humans and biota may be exposed to HC smoke (zinc chloride vapor) by inhalation, plant deposition, or ingestion. Exposures to zinc chloride dust may cause irritation to skin and mucous membranes. Low levels of exposure (160-240 mg-min/m^3) may result in irritation of nose and throat, chest pain, cough, and nausea (U.S. Air Force, 1997). Accidental exposures of 3,500 mg-min/m^3 to 61,000 mg-min/m^3 to exposed men resulted in hospitalization, pulmonary effects, and death. Intravenous injections of zinc chloride at 60-90 mg/kg was lethal to rats. The TLV for zinc chloride is 1 mg/m^3 and the immediately dangerous to life and health (IDLH) level is 2,000 mg/m^3. Exposure to plants at a rate of one M-8 hand grenade over an area of ~7.2 m^2 (~77 ft^2) of land surface is likely to be harmful to sensitive species of trees (U.S. Air Force, 1997).	HC smoke from grenades and pots is frequently used on Eglin test areas (U.S. Air Force, 1997). HC smoke is potentially hazardous to humans and terrestrial animals under certain conditions, which are dependent upon the concentration and duration of the smoke cloud. However, deployment of HC smoke in unconfined spaces is unlikely to reach harmful levels. To prevent impacts, care must be taken to follow appropriate procedures that prevent inhalation exposure during testing activities.

Table I-6. Environmental Fate and Transport, Health Effects, and Exposure Assessment for Pyrotechnics Cont'd

Material	Environmental Fate and Transport	Health Effects	Exposure Assessment
Flares			
Flares	Because flares are ignited during use, most of the components are consumed during combustion. Flare ash, a normal by-product of flare use, is primarily composed of magnesium oxide (MO), which undergoes minimal leaching at pH values typical for Eglin soils and streams (U.S. Air Force, 1997). Flare ash also contains barium, boron, and ammonia (a secondary product).	Concentrations of MO sufficiently great enough to cause metal-fume fever have not been reported in air from a melting room, which has concentrations between 0.08 and 0.7 mg/m^3. Fine particles of magnesium dispersed in air during trimming, filing, buffing, or casting may cause irritation to mucous membranes and eyes (TOXNET, 2003). Animal toxicity data are limited. However, the effects of supplemental magnesium in diets of laying hens on egg production and egg quality (0-1000 mg/kg) was studied. Results showed that layer performance including rate of egg production, egg weight, yolk color, shell break force, feed conversion, and body weight gain, was not influenced by supplemental magnesium (TOXNET, 2003). Barium, boron, and ammonia (a secondary product in flare ash) can affect freshwater aquatic environments. Laboratory tests of flare ash indicated that components readily changed the pH of water. However, changes to the aquatic environment can only result from the deposition of flare ash in high concentrations (U.S. Air Force, 1995). Flare residue in water was toxic to fish at concentrations of 100 mg. The toxic levels varied with different water sources; flare residue suspension in natural waters (from Weekly Pond and Choctawhatchee Bay) were less toxic than suspensions in tap water or distilled water (U.S. Air Force, 1997).	Release of chromium and lead from the use of impulse cartridges with flares may occur. A screening health risk assessment performed to assess the potential health impacts from these emissions concluded that flare use is highly unlikely to result in short-term or long-term health impacts (U.S. Air Force, 1997). The results of this health screening assessments for flare use determined that over a million flares could be used annually in a large airspace area before a threshold level (cancer in one in one million of the exposed population) is reached for short- or long-term health risks from hexavalent chromium or lead. It is unlikely that the threshold limits would be exceeded during MEU training; thus, human health impacts from flares are not anticipated.

mg = milligrams mg/m^3 = milligrams per cubic meter $mg\text{-}min/m^3$ = milligrams per minute per cubic meter m^2 = square meters ft^2 = square feet

Table I-7. Installation Restoration Program Sites

Test Area (Located on or Near)	Site	Location	Description	Potential Impact
A-11A	LF-22	Located south of Hurlburt Field on Santa Rosa Island, ~6.9 miles west of the base gate. North of A-11A	LF-22 encompasses ~0.5 acres. Empty, rusted cans and drums were historically present along the edge of the disposal site. Landfill operations took place during the 1960s and 1970s, and landfill wastes consisted of hard fill, metal spools, waste oil, and empty solvent drums. Site closure consisted of covering the wastes with several feet of local sandy soil.	There are currently no actions taking place at the site. No further action (NFA) is planned for the site.
	AOC-94 Closed Storage Bunkers	East of A-11A on Santa Rosa Island	The site consists of two storage bunkers at the A-11 Compound on Santa Rosa Island. These bunkers were identified as potential storage facilities for napalm and its constituents. Reportedly, the bunkers were constructed in the 1950s for vertical probe-sounding rocket testing. Rocket engines and solid propellants were stored in the bunkers between test missions. It was later found that napalm was not stored here.	The results of a site investigation (SI) performed in 1995 indicated no groundwater impacts. Therefore, NFA was recommended for the site. NFA was approved by EPA 9/30/98 and by FDEP 9/1/98. AOC file closed.
A-31	OT-264 Cattle Dipping Vat	Located ~1.5 miles northeast of Test Area A-31, adjacent to Range Road 678, in Santa Rosa County, Florida	The site is ~ 8,500 square feet. Analysis has showed the presence of arsenic-impacted soil. The SB approved in early 2001 specified no further investigative action with LUCs for soil and NFA for groundwater.	EPA, FDEP, and the public have approved LUCs restricting access and maintaining controls on the site as the selected remedy. To prevent potential impacts, avoid troop movement/digging at this site.
A-77	LDP-34	Located on the northern central portion of A-77	The site is an old target area. The site consists of two bermed areas with 55-gallon, sand-filled target drums forming a ring on the inside of the bermed areas and one shallow trench ~15 by 50 feet. Ordnance found in the area includes 2.75-inch rocket warheads, 40-mm projectiles, and small arms projectiles from 50 cal. and 7.62 mm.	To prevent potential impacts, avoid troop movement/digging at this site.
	LPD-07	Located ~150 feet off from RR 710	This site is a possible operational material disposal pit. The area is ~30 by 50 feet. There are exposed bombs, large sections of metal scrap, 2.75-inch warheads, and metal parts partially exposed. A large number of anomalies exist in the area.	To prevent potential impacts, avoid troop movement/digging at this site.
A-79	POI-506 (LDP-35)	Southeast from A-79	Surface trash pile ~30 feet off the road. There are three metal drums, large pieces of metal scraps, and truck parts. The drums appear to have been cut with an ax to drain unknown contents.	To prevent potential impacts, avoid troop movement/digging at this site.

Table I-7. Installation Restoration Program Sites Cont'd

Test Area (Located on or Near)	Site	Location	Description	Potential Impact
A-15	ST-259 Water Tower No. 12511	Located on Santa Rosa Island, north of RR 242, across the road from Building No. 12510	ST-259 was constructed in the late 1940s. Paint chip analysis indicated that the water tower was coated with lead-based paint. An SI conducted in 1998 showed arsenic above Tier I and Tier II screening levels. Five metals were detected at concentrations above their respective base wide background concentrations for surface soils. Eglin AFB recommended stripping and repainting the water tower and that soil samples be collected and analyzed for total lead and arsenic.	An interim corrective measure (ICM) is scheduled during 2003 to reduce or eliminate the potential for exposure risks at the site to a level sufficient for determination of NFA. To prevent potential impacts from contaminated soils, avoid troop movement/digging at this site.
	POI-405 Low Level Radioactive Material Site	Located on Santa Rosa Island southwest of A-15	POI No. 405 was identified as a BOMARC missile fragment disposal area. The missile debris as well as other material was uncovered, and radioactive debris was separated and placed in approved B-25 boxes. In early 1993, the BOMARC missile debris was removed.	To prevent potential impacts, avoid troop movement/digging at this site.
Auxiliary Field No. 4	OT-262, Cattle Dipping Vat	Located north of Auxiliary Field No. 4	OT-262 is < 0.05 acres in area. In 1998, the presence of arsenic-impacted soil was discovered. The SB, which was approved in early 2001, specified no further investigative action with LUCs for soil and NFA for groundwater.	The USEPA, FDEP, and public have approved LUCs restricting access and maintaining controls on the site as the selected remedy. To prevent potential impacts, avoid troop movement/digging at this site.
B-5	POI- 404	West of Coupland Tower, 15 miles northwest of Eglin Main Base	The area was used for air to ground gunnery testing of depleted uranium fleshettes. Area has scattered debris mostly consisting of concrete with steel rods (rebar).	To prevent potential impacts, avoid troop movement/digging at this site.
B-12	LDP-36	B-12	The area of concern was inspected and a linear anomaly measuring ~3 ft by 5 ft was found. In the general area one 500-pound bomb was found on the surface. This linear anomaly is not suspected to be an LDP but a possible impacted bomb.	To prevent potential impacts, avoid troop movement/digging at this site.
	ST-255 Water Tower No. 7100 (POI-365)	Site B-12 Auxiliary Field 7	Previous investigations at other Eglin water towers have shown that lead-based paint chips have impacted surface soils. Water Tower No. 7100 was constructed in the 1940s. During the SI, peelings of paint on the tower and paint chips on the ground surface were observed. The results of an SI performed in 1998 indicated that the surface soils are impacted with arsenic, chromium, and lead. Analysis of the paint on the water tower indicates that lead-based paint had been applied in the past. POI No. 365 is now designated as IRP Site No. ST-255. An ICM will be performed to remove the impacted soils following stripping and repainting of the tower.	SI completed 1/99. Point of interest (POI) file closed. To prevent potential impacts from contaminated soils, avoid troop movement/digging at this site.

Table I-7. Installation Restoration Program Sites Cont'd

Test Area (Located on or Near)	Site	Location	Description	Potential Impact
B-12 cont'd	POI-309	Site B-12 Auxiliary Field No 7	The site currently consists of a poorly defined depression lying within a wooded area. In 1994, a pit approximately 6 by 4 feet was found to contain rusted paint cans with solidified and liquid paint, rollers, and brushes. All debris (including paint) was removed. Analytical results indicated that all constituents (including lead) were below regulatory standards except one isolated concentration of benzo(a)pyrene that was at a level below the Florida industrial soil cleanup goal. Therefore, NFA was recommended for the site.	As per USEPA and FDEP site visits (conducted 4/97 and 7/97) and FDEP's 1/15/98 and USEPA's 12/9/98 letters, NFA required. POI file closed.
	AOC-08	Auxiliary Field No. 7	The landfill is 6 to 8 acres in size, reportedly inactive, and operated from the 1940s to 1977. Suspected wastes (hardfill and refuse) were disposed of in trenches. Earthen mounds are present in the western and northern parts of the site. Several piles of debris including rusted cans and metal fragments, concrete, glass, asphalt shingles, and asphalt are located in the central and northwest part of the site. Geophysics conducted March 1995 identified anomalies indicative of subsurface metal.	The results of an SI performed in 1997 indicated low concentrations of metals in soils that did not warrant further investigation. Site groundwater was not impacted based on the SI results. Therefore, NFA was recommended for the site. However, to avoid potential impacts, avoid troop movement/digging at this site.
B-70	LDP-37	TA-B-70, location C, end of Range Road by tower	Suspected LDP rumored to be a dumpsite.	To prevent potential impacts, avoid troop movement/digging at this site.
	LDP-38	North of TA B-70	The area is not an LDP. It was rumored to be a disposal site. One rusty metal target drum and one incendiary bomblet were found on the surface.	To prevent potential impacts, avoid troop movement/digging at this site.
	LDP-08	Southeast TA B-70	Known to have munitions on the surface, including bomblets. Due to the large number of bomblets on the surface, a survey was not conducted.	To prevent potential impacts, avoid troop movement/digging at this site.
	LDP-09	Southeast of TA B-70, south of SR 218, where the road splits into SR 218 and 218B	Known burial site with marked signs. There are metal drums, munitions, and bomblets on the surface. There are large pieces of metal sticking out of the ground, as well as metal drums. The area is 50 by 100 feet. Contaminants of concern are synthetic organic compounds (i.e., pesticides and dioxins), volatile organic compounds (chlorides and petroleum hydrocarbons), and inorganics (heavy metals) in soils, sediments, and surface/groundwater.	Potential exposure risks exist to construction workers and potential future residents from soils, groundwater, surface water, and sediments. Digging should not take place with the boundaries of this site to avoid impacts from exposure.
	LDP-10	Southeast of northern portion of TA B-70	There are munitions on the surface and partially buried. The area is ~50 by 100 feet in size.	To prevent potential impacts, avoid troop movement/digging at this site.
	AOC-91 Pocosin Pond Test Area	Pocosin Pond Test Area	Testing of depleted uranium at the Pocosin Pond Test Area began in the early 1960s. Other metals could be present at this site due to conventional munitions exercises. Reportedly, no environmental sampling or monitoring has taken place at this site.	Included in ongoing base wide radiological survey. To prevent potential impacts, avoid troop movement/digging at this site.

Table I-7. Installation Restoration Program Sites Cont'd

Test Area (Located on or Near)	Site	Location	Description	Potential Impact
B-70 cont'd	OT-83 The Cattle Dipping Vat	Located about 540 feet northwest of Test Area B-70	OT-83 is < 1 acre in area. Subsurface arsenic contaminated soils were discovered and removed as part of the RFI in 1997. Future hypothetical risks are present at the site; therefore land use constraints were enacted to prevent contact with site subsurface soils.	To prevent potential impacts, avoid troop movement/digging at this site.
B-71	LDP-39/40	Located at the northwest boundary of Test Area B-71	LDP-39 consists of a large pile of tires and trash. Easy access appears to have been used by troops training. LDP-40 is a large trash pile of building materials and trash on surface.	To prevent potential impacts, avoid troop movement/digging at this site.
	LDP-11	Located at the edge of the woods	Trash pile ~30 by 15 feet in size. There were no munitions found in the area, but there is ammunition-packaging material inside the pit. Large blocks of concrete, and other building materials are next to the pit.	To prevent potential impacts, avoid troop movement/digging at this site.
	LDP-12	Northwest of TA B-71	Large pile trash and tires. Easy access appears to have been used by troops training.	To prevent potential impacts, avoid troop movement/digging at this site.
B-75	LDP-13 Burial Site	Located ~75 feet off the western boundary of TA B-75	There is a trench ~ 1 to 8 feet deep, 20 feet wide, and 150 feet long. There are exposed bomb bodies and other scrap metal on the surface and protruding from the ground. The area is marked with munitions residue signs.	To prevent potential impacts, avoid troop movement/digging at this site.
B-82	AOC-77 Munitions Test Area Disposal Site	TA B-82	The B-82 Munitions Test Area Disposal Site is associated with a one-time disposal of unspecified materials in the early 1980s. Follow-up conversations with an eyewitness of the event indicated that the material was UXO. A hole was dug; the UXO was placed in it, and then exploded. NFA necessary.	This is an active munitions test area. Access to site should be restricted.
C-52A	DP-09 Mullet Creek Drum Disposal Area	South of SR 218, where the road splits into SR 218 and 218B	Between the late 1960s and 1970s, this site was used for disposal of hard fill such as plastics, drums, concrete, etc. Contaminants of concern are synthetic organic compounds (i.e., pesticides and dioxins), volatile organic compounds (chlorides and petroleum hydrocarbons), and inorganics (heavy metals) in soils, sediments, and surface/groundwater. The Final RCRA Facility Investigation/Baseline Risk Assessment (RFI/BRA) concluded that risks to human health and ecological receptors were acceptable, however, institutional controls were recommended. An SB was developed and stated that due to the potential exposure, institutional controls will be implemented within the boundaries of the site. Selected remedial action exists for the site.	Potential exposure risks exist to construction workers and potential future residents from soils, groundwater, surface water, and sediments. Digging should not take place with the boundaries of this site to avoid impacts from exposure.

Table I-7. Installation Restoration Program Sites Cont'd

Test Area (Located on or Near)	Site	Location	Description	Potential Impact
C-52A cont'd	SS-25 The Herbicide Test Grid	C-52A The site is located at the intersection of RRs 222 and 214 and is bounded by Mullet Creek to the west, Trout Creek to the east, and Basic Creek to the northeast	The site ~1.25 square miles and is subdivided into four test grids. This site was used from 1962 to 1970 for evaluation of aerial herbicide spray equipment. Herbicides, fuel oil, and Malathion were used to evaluate the effectiveness of different spray patterns and spray equipment within the four subgrids. Arsenic has been detected at low levels (ranging from 0.212 ppm to 4.141 ppm in soils). A chemical of concern, 2,3,7,8-tetrachlorodibenzo-para-dioxin (TCDD) was contained in 2,4,5-T as a trace contaminant. The average TCDD concentration was 1.98 ppm (based on approximately 500 samples, with a range of 0.02 to 47 ppm) in the surface soils on the grid based on 1984 and 1985 reports. Off-grid soil samples have shown no detectable levels of TCDD above 10 ppm (0.01 ppb). Several other dioxin/furan congeners were detected with the highest concentration (131.98 pg/L) reported for octachlorodibenzodioxin.	Due to potential exposure risks of construction workers and potential future residents to soils, groundwater, surface water, and sediments, LUCs were implemented within the boundaries of the site. To prevent potential impacts avoid, troop movement/digging at this site.
C-52C	LDP-17	C-52C	The area is marked with two munitions residue signs, separated by ~200 feet on the road. There are a large number of metal anomalies in the area. A number of holes are in the ground, measuring ~4 to 5 feet in diameter and 2 to 3 feet deep. Parts of the munitions can be seen in the area of the holes. The ground is sinking around these holes, and care should be taken when approaching these areas. Types of munitions seen in the area are: 5-inch warheads, fins, 5-inch rocket motors, and a large amount of munitions scrap can also be seen.	To prevent potential impacts, avoid troop movement/digging at this site.
C-52N	LDP-18	Located in the southeast corner of C-52N	A large area ~30 feet wide and 200 feet long. No munitions on the surface. There are a number of strong anomaly readings in the area.	To prevent potential impacts, avoid troop movement/digging at this site.
	LDP-42	Located in the southeast corner of C-52N	A large area covered with steel matting. Part is in place; part has been pulled up and placed into piles.	To prevent potential impacts, avoid troop movement/digging at this site.
	LDP-43	Located in the southeast corner of C-52N	There are at least five bomb bodies on the surface. The bombs have been split open to expose contents.	To prevent potential impacts, avoid troop movement/digging at this site.
	OT-46,Open Detonation Site	Range C-52N, ~17 miles northeast of the Eglin Main, located in the northwestern corner of the range	The C52N Test Area is a cleared area ~2.25 by 2.25 miles. The area is used for munitions and weapons system testing and as a gunnery and scoreable bombing range. The site has been used since the 1950s for the disposal of demilitarized munitions and miscellaneous waste explosives.	Groundwater and soil sampling indicates that no contamination is present. To prevent potential impacts, avoid troop movement/digging at this site.

Table I-7. Installation Restoration Program Sites Cont'd

Test Area (Located on or Near)	Site	Location	Description	Potential Impact
C-62	LDP-20	Located on the central portion of Range C-62	Area is a known explosive demolition site. There are a number of munitions parts and pieces laying on the surface. The area is ~100 by 100 feet in size. There are half-buried drums in the area.	To prevent potential impacts, avoid troop movement/digging at this site.
	Site OT-47, the Open Burn/Detonation Site	Located on Range C-62, on the southern side of RR 317, ~0.3 miles from the intersection of RRs 210 and 317	Site OT-47 encompasses <1 acre. Two burn/detonation metal bins have been used for burning and detonating inert munitions and waste explosives since the 1960s. The munitions are ignited using diesel fuel or charcoal lighter fluid. The area surrounding the bins was used as a storage/stockpile area and contained abandoned fuel storage tanks, telephone poles, metal plates, wooden pallets, and several 55-gallon drums.	Eglin AFB received a USEPA/FDEP permit requiring a groundwater monitoring plan and quarterly compliance monitoring. Groundwater and soil sampling indicates that no contamination is present. However, to prevent potential impacts, avoid troop movement/digging at this site.
C-72	LDP-22	Located on the northeast of Range C-72	The area of concern is on both sides of the road at the entry of the sand/clay pit. There are sandbags from the target area that have been dumped on the edge of the entry of the sand/clay pit. Missile body parts and munitions metal parts are mixed in with the sandbags on the surface.	To prevent potential impacts, avoid troop movement/digging at this site.
	LDP-30	Located on the southeast corner of Range C-72	The area of concern is on both sides of the road at the entry of the sand/clay pit. There are sandbags from target area that have been dumped on the edge of the entry of the sand/clay pit. Missile body parts and munitions metal parts are mixed in with the sandbags and on the surface.	To prevent potential impacts, avoid troop movement/digging at this site.
	POI-406	Located on the northeast corner of C-72	Alleged DU Firing Range (20-mm rounds). DU fragments were relatively shallow (0 to 24 inches below ground surface).	Closed IRP site. However, to prevent potential impacts, avoid troop movement/digging at this site.
Choctaw Field	OT-271, Cattle Dipping Vat	Near Choctaw Field (Auxiliary Field No. 10)	The site is constructed of concrete and is ~25 feet long by ~4 feet deep. The vat extends ~1 foot above the ground surface and is filled in with dry sandy soils. Concentrations of arsenic were found above Tier I and Tier II levels in soils. Activities in 2001 included excavation and off-site disposal of ~849 cubic yards of arsenic-impacted soils.	LUCs in place at the site. To prevent potential impacts, avoid troop movement/digging at this site.

AOC = Area of Concern
DP = Disposal Pit
DU = Depleted Uranium
LDP = Legacy Debris Pit
LF = Landfill
LUC = Land Use Control
ICM = Interim Corrective Measure
IRP = Installation Restoration Program
NFA = No Further Action
OT = Other
POI = Point of Interest
RR = Range Road
SB = Statement of Basis
SI = Site Investigation
FDEP = Florida Department of Environmental Protection
mm = millimeters
ft = feet
ppm = parts per million
pg/L = picograms per liter

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APPENDIX J

TECHNICAL APPENDIX NOISE LEVEL CALCULATIONS

TECHNICAL APPENDIX NOISE LEVEL CALCULATIONS

1. INTRODUCTION

Noise is one of the most common environmental impacts associated with the conduct of military operations and military training activities. Elevated noise levels arise from many sources during the conduct of these activities. In order to assess potential impacts resulting from this noise, modeling and other calculation or estimation techniques are employed. However, information derived from these processes is static and perishable. Results are usually only obtained for a specific set of circumstances or level of activity. If changes in the levels of activity are proposed, all of the assessment processes must be reaccomplished.

2. OVERVIEW

This Technical Appendix describes a methodology to assess changing requirements in a more dynamic and streamlined manner. The methodology is based on the concept of defining the noise resulting from the activity as a single action performed in a single day. Then, based on standard operational parameters, and using the mathematical concepts of scaling and equivalency, noise levels resulting from any proposed level of activity can be rapidly and accurately calculated.[1] The step-by-step process is explained in detail below. This is then followed by a sample worksheet defining the calculations required and containing an illustrative example. While a hand-held calculator is sufficient to perform all required calculations, the process can be even more streamlined by incorporating the worksheet calculations into a computer spreadsheet.

3. THE EQUIVALENCY PROCESS

3.1 STEP 1

The first step in the process is to model, calculate, or estimate a day-night average noise level that would result from one operation in a day conducted during the day (i.e., between the hours of 7:00 A.M. and 10:00 P.M.). This can be considered the same as L_{dn} or $L_{eq(24)}$. Noise averaged over a 24-hour period is the most commonly accepted metric for assessing impacts. The noise calculated at this point refers to the noise associated with **one day-equivalent operation**. As will be shown later, if the event occurs at night (i.e., between 10:00 P.M. and 7:00 A.M.), it will be considered as **10 day-equivalent events**. This multiplier assesses penalties associated with noise events during nighttime hours when there is heightened sensitivity to noise.

3.2 STEP 2

This calculated noise level is next scaled to a **single equivalent operation**. In order to do this, a determination of “target” noise levels must be made. The most common targets are a day-night

1 This technique has been rigorously validated through comparison of calculated data and modeled data. The methodology has demonstrated a correlation coefficient (R-squared) of greater than 0.999.

average noise level of 65 decibels for A-weighted noise (dBA) and 62 decibels for C-weighted noise (dBC). These are the levels that, below which, there are no constraints recommended on any land uses, and the probability of significant population annoyance is minimal. Nevertheless, any level can be chosen. All that is critical is that once this value is selected, it forms the basis for calculating a reference value used in the equation below. This **reference level** will always be 30 less than the target value.

A single equivalent operation (SEO) is calculated by:

$$SEO = 10^{\frac{CL-RL}{10}}$$

Equation 1

Where: CL = calculated (or modeled) noise level
RL = reference level (if the target level is 65, RL will be 35; if the target level is 62, RL will be 32)

3.3 STEP 3

Next, the number of operations requiring assessment must be determined. Noise level calculations yield a daily L_{dn}, which represents average exposure over the course of a year. Therefore, total annual operations are normalized to noise events expected to occur during a single 24-hour period. Averaging simply levels exposure and minimizes the effects of periods when many noise events occur or very few occur. Nevertheless, if it is desired to estimate effects of a specific exercise during the day(s) when it is occurring, this process supports those calculations as well. The total number of operations (TO) to be considered is calculated by:

$$TO = N_{Day} + (10 \times N_{Night})$$

Equation 2

Where: TO = total operations considered in designated time frame
N_{Day} = number of day operations (7:00 A.M. – 10:00 P.M.)
N_{Night} = number of night operations (10:00 P.M. – 7:00 A.M.)

3.4 STEP 4

Next, the daily operations are converted into total equivalent operations (TEO) by:

$$TEO = SEO \times TO$$

Equation 3

Where: SEO = single equivalent operation (Equation 1)
TO = total operations (Equation 2)

3.5 STEP 5

Finally, equivalent operations are converted back to a sound level by:

$$L_{dn} = L_{dn}\ Max - \left[10 \times Log_{10}\left(\frac{1000}{TEO}\right)\right]$$

Equation 4

Where: L_{dn} = applicable day-night average sound level
L_{dn} Max = maximum desired (or target) sound level (See Step 1)
TEO = total equivalent operations (Equation 4)

4. SCALING PROCESS

While not a part of the equivalency methodology, in order to bound levels of operations, it is often useful to scale noise levels from a given, known level of operations to the maximum number of operations that could be performed and not exceed a target noise level. It should be noted that the designated target noise level could be greater than or less than that which exists under current operations.

The number of operations are scaled by:

$$OPS_{Max} = 10^{\frac{DB_{Max} - DB_{Current}}{10}} \times OPS_{Current}$$

Equation 5

Where: OPS_{Max} = maximum number of operations possible
DB_{Max} = maximum acceptable noise level
$DB_{Current}$ = current noise level with current operations
$OPS_{Current}$ = current number of operations

5. EQUIVALENCY WORKSHEET

Table J-1 is provided as a tool to support application of the equivalency methodology described above. It contains an example of the calculations based on the one, and 4.5 amphibious landings discussed in Section 4.3 and detailed in Tables 4-3 and 4-4 in the document. The example is based on the values associated with $L_{eq(24)}$ for the leading edge of the exercise area. Values associated with vehicular movements are shown in A-weighted decibels; values associated with live fire exercises are shown in C-weighted decibels.

Table J-1. Operational Equivalency Worksheet

Mission / Region	Distance	Calculated Noise	SEO (Eq. 1)	Operations Day	Operations Night	TO (Eq. 2)	TEO (Eq. 3)	L_{dn} (Eq. 4)
MEU Landing	500	54.9	97.7	4.5	--	4.5	439.65	61.4
Leading Edge	1,000	51.5	44.7	4.5	--	4.5	201.15	58.0
	2,000	48.3	21.4	4.5	--	4.5	96.30	54.8
	3,000	46.4	13.8	4.5	--	4.5	62.10	52.9

APPENDIX K

STATE HISTORIC PRESERVATION OFFICE CONSULTATION

MAR 17 2000

Ms. Maria Rodriguez
Chief, Historic Preservation Division
Eglin Air Force Base
501 DeLeon St., Suite 101
Eglin AFB, FL 32542-5133

REF: Amphibious Readiness Group/Marine Expeditionary Unit training

Dear Ms. Rodriguez:

We have received your documentation and determination of adverse effect for the referenced project. Based upon the information you provided, we do not believe we need to participate in the consultation to develop the Memorandum of Agreement for the project. However, should circumstances change and you determine that our participation is required, please notify us.

We note in your letter that Indian tribes have been contacted and have not identified any historic properties on Eglin lands that are of religious or cultural significance to them. Given that prehistoric archaeological site 8OK239 will be subject to archaeological data recovery prior to its being destroyed by clearing and grading activities, its archaeological data recovery plan should contain a protocol for contacting concerned Indian tribes (and meeting Air Force responsibilities under the Native American Graves Protection and Repatriation Act) in the event that human remains are encountered, either during data recovery or in subsequent grading and clearing.

Pursuant to the Council's regulations, you will need to file the final Memorandum of Agreement and related documentation at the conclusion of the consultation process. The filing of this Memorandum of Agreement with the Council is required in order for the Air Force to complete its compliance responsibilities under Section 106 of the National Historic Preservation Act.

Thank you for providing us with the information. If you have any questions, please contact Dr. Tom McCulloch at 202-606-8554.

Sincerely,

Don L. Klima
Director
Office of Federal Agency Programs

ADVISORY COUNCIL ON HISTORIC PRESERVATION

1100 Pennsylvania Avenue NW, Suite 809 • Washington, DC 20004
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MEMORANDUM OF AGREEMENT

BETWEEN

EGLIN AIR FORCE BASE (AFMC),

THE UNITED STATES MARINE CORPS,

AND
THE FLORIDA STATE HISTORIC PRESERVATION OFFICER,

CONCERNING

MITIGATION OF ADVERSE EFFECTS OF TRAINING EXERCISES
ON ARCHAEOLOGICAL AND HISTORIC PROPERTIES

WHEREAS, the real property comprising Eglin Air Force Base (AFB) is under the control of the Air Armament Center, Eglin AFB;

WHEREAS, Atlantic Fleet, United States Navy, and the United States Marine Corps (USMC), propose to conduct Amphibious Ready Group/Marine Expeditionary Unit (ARG/MEU) readiness training exercises at Eglin AFB, and such training will constitute an "undertaking" under Section 106 of the National Historic Preservation Act, 16 U.S.C. 470f (NHPA); AND

WHEREAS, USMC will be the proponent and sponsor of said undertaking, and Eglin AFB will be the "lead federal agency," as defined in 36 CFR 800.2(a)(2), and will act on behalf of USMC in fulfilling the responsibilities of both under Section 106;

NOW, THEREFORE, Eglin AFB, USMC and the Florida State Historic Preservation Officer (SHPO) hereby agree that said undertaking will be administered in accordance with the following stipulations to satisfy the parties' Section 106 responsibilities.

I. IDENTIFICATION OF HISTORIC PROPERTIES

A. Predictive Modeling and Mapping

1. Prior to the commencement of the undertaking, Eglin AFB will identify, in consultation with the SHPO, all areas within the areas of potential effect (APEs) that contain, or are likely to contain, archaeological or historic resources eligible or potentially eligible for inclusion on the National Register of Historic Places (NRHP). The results of this analysis will be rendered in the form of Geographical Information

System (GIS) data layers that will be compatible with Eglin AFB's existing GIS. The data layers will include the following elements:

a. Low Probability Areas (LPAs). Areas within the APE that do not contain eligible or potentially eligible historic properties, or are considered unlikely to contain such properties.

b. High Probability Areas (HPAs). Areas within the APE that are likely to contain eligible or potentially eligible historic properties.

c. Archaeological Buffer Zones. Buffer zones that will be established a minimum of 50 meters beyond the known or expected extent of archaeological deposits at each identified eligible or potentially eligible historic property.

2. Prior to the commencement of the undertaking, Eglin AFB will identify, in consultation with the SHPO, the known historic properties within the APE that may have the potential to be adversely affected by the displacement of soil or artifacts as a result of the movement of troops traveling on foot.

3. Prior to the commencement of the undertaking, Eglin AFB will prepare, in consultation with the SHPO, a map or series of maps, as appropriate, depicting the APE and containing the following geographic elements:

a. No Vehicles/No Digging Areas. Areas that include all HPAs and archaeological buffer zones. Disturbance of the soil in these areas may have a potential to adversely affect known or undiscovered historic properties. Existing roadbeds are not included in this element.

b. No Troop Areas. Areas that contain or are likely to contain archaeological resources on or near the surface of the ground that have the potential to be disturbed by the movement of ground troops. Existing roadbeds are not included in this element.

B. Archaeological Inventory and Delineation

1. If digging, construction, vehicular traffic, or other ground-disturbing activities are to occur in an HPA, as defined in Section I(A) above, Eglin AFB will conduct an archaeological survey, in consultation with the SHPO, to inventory (locate) and delineate the boundaries of archeological sites within the area potentially affected by the activity, pursuant to 36 CFR 800.4. Archaeological surveys are not required within LPAs.

2. Eglin AFB will conduct surveys in accordance with the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44716), applicable SHPO guidelines, and AFI 32-7065, to meet the requirements of Section 110(a)(2) of the NHPA.

3. If potentially eligible properties are found, Eglin AFB will establish an archaeological buffer zone as described above, and will proceed in accordance with Section I(C) below.

C. Archaeological Test and Evaluation

1. If digging, construction, vehicular traffic, or other ground-disturbing activity is likely to occur in an archaeological buffer zone and the buffer zone contains an eligible historic property, Eglin AFB will proceed in accordance with Section II below. If the historic property or properties within the effected buffer zone have not yet been determined eligible or ineligible, Eglin AFB will conduct archaeological test excavations, in consultation with the SHPO, and determine the eligibility of the property by applying the NRHP criteria set forth in 36 CFR 60.4.

2. Eglin AFB will conduct test excavations in accordance with the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44716), applicable SHPO guidelines, and AFI 32-7065, to meet the requirements of Section 110(a)(2) of the NHPA.

3. If the SHPO and Eglin AFB agree, following archaeological test and evaluation, that a property is not eligible for listing on the NRHP, the parties agree there will be no effect to the property as a result of the undertaking.

4. If the SHPO and Eglin AFB do not agree on NRHP eligibility, or if the Advisory Council on Historic Preservation or National Park Service so request, Eglin AFB will request a formal determination of eligibility from the Keeper of the National Register, National Park Service, whose determination will be final.

II. TREATMENT OF HISTORIC PROPERTIES

A. Avoidance of Adverse Effect

1. USMC and Eglin AFB will avoid digging, construction, vehicular traffic, munitions use, or other ground-disturbing activities in the vicinity of historic properties eligible or potentially eligible for listing on the NRHP. Eglin AFB and USMC will consult during the planning stages of each training mission to ensure that project planners are aware of the locations of historic properties. Eglin AFB will install fences or other forms of marking, as appropriate, around archaeological buffer zones to alert troops in the field to the presence of historic properties. USMC and Eglin AFB will ensure all protective measures are completed prior to the commencement of training exercises that could affect the historic properties being protected. Where avoidance cannot be achieved, the parties will proceed in accordance with Section II(B) below.

2. Prior to each training mission Eglin AFB will determine, after consulting with USMC mission planners, whether planned mission activities have the potential to cause ground disturbance in the HPAs or archaeological buffer zones. If there is a potential for such

areas to be disturbed, Eglin AFB will proceed in accordance with Section I(B) or Section I(C) above, as appropriate.

3. Eglin AFB will install fences at locations specified in Section II(C) below, and in areas where specific training activities are planned that have the potential to adversely effect identified archaeological buffer zones. Eglin AFB will consult with the SHPO prior to training exercises to determine which properties require fences to achieve avoidance of adverse effect. The use of fences to achieve avoidance will be minimized to the extent possible in order to reduce mission impact on the Eglin reservation.

4. The type of fence construction used at a particular site will be determined by Eglin AFB in consultation with the SHPO. The purpose of the fencing is to increase visibility of sensitive areas during training activities, not to create a physical barrier to prevent access. Eglin AFB and USMC will ensure all fences likely to be encountered during a particular training exercise are marked beforehand with infrared tape so as to be visible at night by troops using night-vision equipment.

5. Where possible and appropriate to achieve avoidance of adverse effects without resorting to the installation of fences, marking the locations of historic properties in the field using visible markers alone will be sufficient. Eglin AFB will install the markers in locations corresponding to the mapped boundaries of archaeological buffer zones. The type of marking used at a particular site will be determined by Eglin AFB in consultation with the SHPO. Eglin AFB and USMC will ensure all such boundaries likely to be encountered during a particular training exercise are marked beforehand with infrared tape so as to be visible at night by troops using night-vision equipment.

6. Avoidance of HPAs will be accomplished without the installation of fences or markers.

B. Mitigation of Adverse Effect

1. If avoidance of historic properties cannot be achieved, Eglin AFB will develop a mitigation plan, in consultation with the SHPO and other interested parties, as appropriate, that will outline specific actions that must be taken to minimize or mitigate adverse effects. The plan may include data recovery, active protective measures, or a combination of both.

2. The mitigation plan will be implemented prior to the commencement of the aspect of the undertaking that has the potential to cause adverse effect.

3. If HPAs, archaeological buffer zones, or fences surrounding buffer zones are damaged, disturbed or destroyed as a result of the undertaking, USMC will take measures to prevent further damage and report the incident to Eglin AFB's Environmental Management Directorate (AAC/EM). AAC/EM will assess the effects of the disturbance and determine, in consultation with the SHPO, what actions are necessary, if any, to

repair the damage and avoid adverse effects in the future. Such actions may include archaeological survey, active protection measures, data recovery, or a combination thereof.

C. Site-Specific Treatment Requirements

1. *Wynnehaven Beach Landing Site.* Archaeological site 8OK239 will be adversely affected as a result of planned site improvements to accommodate ARG/MEU training. The adverse effect will be mitigated through data recovery excavations resulting in the recovery of a minimum of eight percent of the site area, or a total area of at least 294 square meters, following a data recovery plan approved by Eglin AFB and the SHPO on 28 Feb 03.

a. No ground-disturbing activities will be conducted at the site until data recovery excavations are completed, with the exception of geophysical analyses required to complete engineering plans. All such geophysical work will be coordinated with AAC/EM at least three workdays in advance and monitored by a professional archaeologist chosen by AAC/EM.

b. Construction activities will not commence until the SHPO has certified in writing that data recovery excavations have been completed.

c. All construction activities at Wynnehaven Beach will be coordinated with AAC/EM at least three workdays in advance. AAC/EM will determine whether a particular proposed construction activity is likely to be intrusive enough to warrant on-site archaeological monitoring. Intrusive construction activities will be monitored for the presence of post-review discoveries by a professional archaeologist chosen by AAC/EM.

d. If post-review discoveries are identified by the archaeological monitor, the parties will proceed in accordance with Section IV below.

2. *Santa Rosa Island.* Avoidance of adverse effect on Santa Rosa Island can be achieved by implementing the following stipulations:

a. Eglin AFB will inventory and evaluate all historic properties within the Santa Rosa Island APE in accordance with Section I(B) above.

b. Eglin AFB will install fences around all eligible historic properties in accordance with Section II(A) above prior to the commencement of the undertaking.

c. If avoidance cannot be achieved through fencing, the parties will proceed in accordance with Section II(B) above.

3. *Alaqua Point Landing Site.* Avoidance of adverse effect at the Alaqua Point landing site can be achieved by implementing the following stipulations:

a. Eglin AFB will inventory and evaluate all historic properties within the Alaqua Point APE in accordance with Section I(B) above prior to any activities that may disturb the soil within the APE and make the results available to USMC for mission planning purposes.

b. Eglin AFB will install fences or markers, as appropriate, around all eligible historic properties in accordance with Section II(A) above prior to any activities that may disturb the soil within the APE.

c. If avoidance cannot be achieved through fencing or marking, the parties will proceed in accordance with Section II(B) above.

4. *East Bay Landing Site.* Avoidance of adverse effect at the East Bay Point landing site can be achieved by implementing the following stipulations:

a. Eglin AFB will inventory and evaluate all historic properties within the East Bay Point APE in accordance with Section I above prior to any activities that may disturb the soil within the APE and make the results available to USMC for mission planning purposes.

b. Eglin AFB will install fences or markers, as appropriate, around all eligible historic properties in accordance with Section II(A) above prior to any activities that may disturb the soil within the APE.

c. If avoidance cannot be achieved through fencing or marking, the parties will proceed in accordance with Section II(B) above.

5. *White Point Landing Site.* Avoidance of adverse effect at the White Point landing site can be achieved by implementing the following stipulations:

a. Eglin AFB will inventory and evaluate all historic properties within the White Point landing site APE in accordance with Section I above prior to any activities that may disturb the soil within the APE and make the results available to USMC for mission planning purposes.

b. Eglin AFB will install fences or markers, as appropriate, around all eligible historic properties, except 8OK784, in accordance with Section II(A) above prior to any activities that may disturb the soil within the APE.

c. Site 8OK784, located within the Maxwell-Gunther Recreation Area, will be avoided without the installation of fences or markers.

d. If avoidance of other eligible properties cannot be achieved through fencing or marking, the parties will proceed in accordance with Section II(B) above.

6. *Test Area D-84 Landing Site.* Avoidance of adverse effect at the Test Area D-84 landing site can be achieved by implementing the following stipulations:

a. Eglin AFB will install fences or markers, as appropriate, along the eastern boundary of site 8WL68 and the western boundary of site 8WL58, in accordance with Section II(A) above prior to any activities that may disturb the soil within the APE.

b. All construction activities at Test Area D-84 will be coordinated with AAC/EM at least three workdays in advance. AAC/EM will determine whether a particular proposed construction activity is likely to be intrusive enough to warrant on-site archaeological monitoring. Intrusive construction activities will be monitored for the presence of post-review discoveries by a professional archaeologist chosen by AAC/EM.

c. If post-review discoveries are identified by the archaeological monitor, the parties will proceed in accordance with Section IV below.

7. *Test Area A-22 Landing Site.* Avoidance of adverse effect at the Test Area A-22 landing site will be achieved without the installation of fences or markers by confining all vehicular and troop activity to the area outside the archaeological buffer zone surrounding site 8OK942.

8. *Yellow River Landing Sites.* Avoidance of adverse effect at the Yellow River landing sites can be achieved by implementing the following stipulations:

a. Eglin AFB will inventory and evaluate all historic properties within the Yellow River APE in accordance with Section I(B) above prior to any activities that may disturb the soil within the APE.

b. Eglin AFB will install fences or markers, as appropriate, around all eligible historic properties in accordance with Section II(A) above prior to any activities that may disturb the soil within the APE.

c. If avoidance cannot be achieved through fencing or marking, the parties will proceed in accordance with Section II(B) above.

9. *Hurlburt Field Landing Site.* Avoidance of adverse effect at the Hurlburt Field landing site can and will be achieved without the installation of fences or markers by confining all vehicular activity to the existing gravel offload area.

10. *Range Road Improvements.* Avoidance of adverse effects during road construction and maintenance activities associated with the undertaking can be achieved by implementing the following stipulations:

a. Eglin AFB will inventory and evaluate all historic properties within the APE along Range Roads 253, 259, 666, and 668 and establish archaeological buffer zones around all eligible historic properties prior to any activities that may disturb the soil along these roads, with the exception of geophysical analyses required to complete engineering plans. All such geophysical work will be coordinated with AAC/EM at least three workdays in advance and monitored by a professional archaeologist chosen by AAC/EM.

b. Eglin AFB and USMC will avoid ground-disturbing activities within archaeological buffer zones in accordance with Section II(A) above.

c. Eglin AFB will install fences or markers, as appropriate, around all eligible historic properties in accordance with Section II(A) above prior to any activities that may disturb the soil along these roads.

d. If avoidance cannot be achieved, the parties will proceed in accordance with Section II(B) above.

III. CURATED ITEMS

All artifacts recovered and records produced during all phases of archaeological excavation conducted under this agreement will be housed in the Eglin AFB on-base curation facility, which meets all the criteria for permanent storage of federal collections listed in 36 CFR 79.

IV. PROVISION FOR POST-REVIEW DISCOVERIES

A. In accordance with 36 CFR 800.13, if previously undetected or undocumented historic properties are discovered during project activities, Eglin AFB and USMC will cease any activity having an effect and consult with the SHPO and other interested parties, as appropriate, to determine if additional investigation is required. If it is determined that further investigation is required, the parties will proceed in accordance with Section II(B) of this agreement.

B. If human remains, funerary objects, sacred objects, or objects of cultural patrimony are encountered either during archaeological excavations or during any project construction activities, the parties will comply with all provisions required under appropriate federal and state acts, statutes, guidance, provisions, etc., and any decisions regarding the treatment of such items will be made in consultation with the SHPO and other interested parties, including federally recognized American Indian Tribes, as appropriate.

V. DISPUTE RESOLUTION

Should the SHPO or the Advisory Council on Historic Preservation (ACHP) object within thirty (30) days to any plans or actions provided for review pursuant to this agreement, Eglin AFB will consult with the objecting party to resolve the objection. If Eglin AFB determines that the disagreement cannot be resolved, Eglin AFB will request further comment from the ACHP in accordance with the applicable provisions of 36 CFR 800.7. Eglin AFB in accordance with 36 CFR 800.7(c)(4) will take any ACHP comment provided in response into account, with reference only to the subject of the dispute. Eglin AFB's responsibility to carry out all actions under this agreement that are not the subjects of the dispute will remain unchanged.

VI. TERMINATION

Any party may request a reconsideration of its terms or revoke the relevant portions of this agreement upon written notification to the other parties, by providing thirty (30) days notice to the other parties, provided that the parties will consult during the period prior to termination to seek agreement on amendments or other actions that would avoid termination. In the event of termination, Eglin AFB will comply with 36 CFR Parts 800.3 through 800.7 with regard to individual aspects of the undertaking covered by this agreement.

VII. AMENDMENTS

Any party may request that this agreement be amended, whereupon the other parties will consult in accordance with 36 CFR 800.13 to consider such amendment.

VIII. EXECUTION AND IMPLEMENTATION

A. Nothing in this agreement is intended to prevent Eglin AFB from consulting more frequently with the SHPO concerning any questions that may arise or on the progress of any actions falling under or executed by this agreement. Any resulting modifications to this agreement will be coordinated in accordance with 36 CFR 800.5(e)(5).

B. The undersigned concur that Eglin AFB has satisfied its Section 106 responsibilities with respect to ARG/MEU training at Eglin AFB.

IX. SIGNATORIES TO THIS AGREEMENT

FOR EGLIN AIR FORCE BASE:

Robert W Chedister Date: 4 Apr 03

Robert W. Chedister, Commander, Air Armament Center

FLORIDA STATE HISTORIC PRESERVATION OFFICER:

Janet Snyder Matthews Date: 5/25/2003

Janet Snyder Matthews, Ph.D., Florida State Historic Preservation Officer

FOR THE U.S. MARINE CORPS:

Date: 5/1/03

Thomas S. Jones
Major General, US Marine Corps
Commanding General, Training and Education Command

APPENDIX L

USFWS BIOLOGICAL OPINION

U.S. Marine Corps Expeditionary Unit Training
at
Eglin Air Force Base

Draft Biological Opinion
April 7, 2003

Prepared by:
U.S. Fish and Wildlife Service
1601 Balboa Avenue
Panama City, FL

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Field Office
1601 Balboa Avenue
Panama City, Florida 32405

Tel: (850) 769-0552
Fax: (850) 763-2177

April 15, 2003

Maj. General Robert W. Chedister
Commander
101 W.D. Avenue, Suite 116
Eglin Air Force Base, FL 32542-5495

Attn: Mr. Richard McWhite

Re: FWS Log No. 4-P-03-052
Date Started: March 21, 2003
Project Title: U.S. Marine Corps Expeditionary Unit Training at Eglin AFB
Ecosystem: NE Gulf
County: Walton, Okaloosa, and Santa Rosa Counties, Florida

Dear General Chedister:

Enclosed is the Fish and Wildlife Service's (Service) Biological Opinion (BO) for the U.S. Marine Corps Amphibious Ready Group/Expeditionary Unit (ARG/MEU) Readiness Training at Eglin Air Force Base (Eglin), Florida. This opinion is provided in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

The Biological Assessment (BA) for the MEU Training identified 12 federally listed species known to occur on Eglin: red-cockaded woodpecker, four species of sea turtles, flatwoods salamander, bald eagle, Okaloosa darter, Gulf sturgeon, eastern indigo snake, Florida perforate lichen, and piping plover. The BA made a determination of "likely to adversely affect" for the four species of sea turtles and the flatwoods salamander. The Service has determined that MEU training activities would not jeopardize the continued existence of these species. We have identified Terms and Conditions to minimize the potential for incidental take of sea turtles and the flatwoods salamander. Implementation of these Terms and Conditions are non-discretionary in order to be exempt from the taking prohibitions of Section 9 of the Act.

The Service concurs with the determination in the BA of "not likely to adversely affect" for red-cockaded woodpecker, bald eagle, Okaloosa darter, Gulf sturgeon (including its critical habitat),

eastern indigo snake, piping plover (including its critical habitat) and Florida perforate lichen. This concurrence is based upon implementation of the avoidance and minimization measures identified in the BA and supplemental information provided in Mr. McWhite's letter of March 21, 2003. We have included the avoidance and minimization measures in the *Conservation Measures* Section of BO (beginning on page 12). Our concurrence is also based on Eglin Natural Resources Branch providing our office with an annual report identifying the conservation measures that were employed and the actions taken to implement the terms and conditions for each ARG/MEU exercise that was conducted. This report should include the dates and timing of activities, an assessment of the effectiveness of the conservation measures and terms and conditions, and a plan of action to address any unexpected adverse impacts to habitats resulting from ARG/MEU activities. Failure to implement the protective, avoidance, and minimization measures as identified in your plan, terms and conditions, or failure to provide an annual report, would result in reinitation of consultation. Additional information on reinitiation is provided in the Reiniatation Notice of the Biological Opinion.

We have also provided Conservation Recommendations which are actions that would help Eglin and the Marine Corps further the recovery of federally listed species and help conserve other species that occur on Eglin AFB. While they are voluntary actions, we feel that many of the recommendations we have provided will help the Marines and Air Force meet their responsibilities under Section 7(a)(1) of the Act.

If you have any questions or concerns about this consultation or the consultation process, please contact Mr. Stan Simpkins at ext. 234.

Sincerely yours,

Gail A. Carmody
Project Leader

Enclosure:
Biological Opinion

cc:
Cindy Dohner, FWS, Atlanta, GA
FWS, ES, Clemson, SC (Ralph Costa)
FWS, ES, Jackson, MS (Linda LaClaire)
FWS, Jacksonville Field Office, FL (Sandy MacPherson)
FWS, Habitat Conservation/section 7, Atlanta, GA (e-mail copy to Joe Johnston)
NMFS, Protected Species, St. Petersburg, FL
U.S. Corps of Engineers, Jacksonville District, Panama City, FL (Teresa Zar)
FWC, Office of Protected Species, Tallahassee, FL (Robbin Trindell)
FWC, Office of Environmental Services, Tallahassee, FL (Rick McCann)
FWC, Non-game Program, Panama City, FL (Karen Lamonte)

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INTRODUCTION

This document transmits the Fish and Wildlife Service's biological opinion (BO) for the U.S. Marine Corps Expeditionary Unit (MEU) Readiness Training at Eglin Air Force Base (Eglin). This opinion is in accordance with Section 7 of the Endangered Species Act of 1973, as amended (Act) of 1973, (16 U.S.C. 1531 *et seq.*) and the Sikes Act, as amended (6 U.S.C. 670a *et seq.).*

This biological opinion is based on information provided in the March 7, 2003 project Biological Assessment (BA) and draft Environmental Assessment (EA), supplemental information supplied by Eglin, and discussions with Eglin Natural Resources Branch staff. A complete administrative record of this consultation is on file in the Service's Panama City, Florida Field Office.

CONSULTATION HISTORY

<u>December 12, 2002</u>	At a meeting with the Service and other federal and state agencies, conducted in the office of Eglin Natural Resources Branch (NRB), the U.S. Marine Corps and Eglin NRB introduces a proposal to conduct MEU training at Eglin AFB.
<u>December 19, 2002</u>	The Service meets with Eglin NRB and their consultant, Science Applications International Corporation (SAIC) and discussed preliminary issues and concerns for each federally listed species on Eglin. We also supplied SAIC preliminary information on informational needs in the project (BA) and we discussed the structure of the BA.
<u>January 29, 2003</u>	The Service receives a preliminary internal draft EA and BA.
<u>February 3, 2003</u>	The Service e-mails comments on the preliminary internal draft documents for sea turtles, piping plover, Florida perforate lichen, Okaloosa darter, and Gulf sturgeon.
<u>February 4, 2003</u>	The Service e-mails comments on the preliminary draft documents for red-cockaded woodpecker (RCW), eastern indigo snake, and bald eagle.
<u>February 7, 2003</u>	The Service meets with SAIC to discuss needs for clarification and additional information for the flatwoods salamander.
<u>February 11, 2003</u>	The Service e-mails comments on flatwoods salamander based on the meeting with SAIC on 02/11/03.

February 12, 2003	The Service e-mails additional comments on coastal species.
February 28, 2003	The Service receives a revised draft EA and BA based on internal review conducted by Eglin NRB and the Marine Corps.
March 6, 2003	Eglin NRB e-mails the Service the second revised draft EA and final BA requesting initiation of formal consultation for the MEU training.
March 11, 2003	The Service meets with Eglin NRB and SAIC to discuss need for additional information for the RCW.
March 12, 2003	The Service e-mails comments on the second revised draft EA for coastal species.
March 14, 2003	The Service e-mails draft partial list of Reasonable and Prudent Measures (RPMs) and Terms and Conditions (TCs) for sea turtles for review by Eglin NRB.
March 17, 2003	The Service faxes letter to Eglin NRB informing them that additional information and clarification is needed before formal consultation can be initiated.

March 19, 2003	The Service meets with Eglin NRB and SAIC and discusses comments made by the Service via e-mails and letters during the period from 03/11/03 to 03/17/03.
March 21, 2003	The Service receives fax from Eglin NRB of letter providing additional information and clarification for initiating formal consultation.
March 24, 2003	The Service faxes a letter to Eglin NRB acknowledging and concurring with request for formal consultation.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The U.S. Marines and U.S. Navy propose to conduct Amphibious Ready Group/Marine Expeditionary Unit (ARG/MEU) training at Eglin Air Force Base (AFB). This training is anticipated to occur twice per year with each training event having a total duration of 10 days, or less, if only a portion of the activities is conducted. It is possible that the training may occur only once during some years, and possibly not at all, in others. ARG/MEU readiness training exercises involve a variety of activities. A description of each type of training activity is provided below, along with potential locations and duration. The discussion also identifies several types of vehicles and aircraft associated with each activity. For a description of this equipment, please refer to Appendix G of the March 7, 2003 Draft Environmental Assessment (DEA). Based on operational criteria, all potential locations for conducting each activity were considered. The Marine Corps desires to have the potential to use any or all of the proposed locations for each activity.

ARG/MEU Activities

Insertion of Forward Command Element: This event consists of 15 to 50 Marines coming ashore by any of the following means: helicopter, small boat or landing craft, or by civilian transport (assumes prior move from ship). These forces would move to a designated site designed to represent a U.S. embassy or consulate. Once at the site, this group would interface with State Department role players, provide security for the site, and prepare evacuation sites. During the following 72 hours, role players acting as demonstrators establish a constant and escalating presence at the site.

Duration: 72 hours
Number of events: 1
Locations: Several helicopter landing zones (HLZs), Duke Field, Choctaw Field, or Eglin Main Base (For a map, refer to figure Figure A-1 in the March 7, 2003 Draft Environmental Assessment [DEA])

Site/Infrastructure Improvements: None needed.
Insertion of Reconnaissance and Surveillance (R&S) Teams: A mission undertaken either to obtain, by visual observation or other detection methods, information about the activities and resources of an actual or potential enemy or to secure data concerning the meteorological, hydrographical, or geographical characteristics of a particular area. Four- to five-man teams establish an observation point and stay ashore one to three days.

Duration: 4 to 5 hours per event under cover of darkness
Number of events: up to 25 events per 10-day training period
Delivery vehicles: helicopters, parachutes, or Zodiac boats
Locations: Santa Rosa Island, Yellow River, East Bay River, East Bay Point, and all established boat landing sites and helicopter landing zones (For a map, refer to Figure A-2 in the March 7, 2003 DEA)
Site/Infrastructure Improvements: None needed.

Ship Operations: Transport of the MEU would be conducted by Naval ships from various locations throughout the United States to the Gulf of Mexico. ARG operations would take place within the Inner Transport Area. The Inner Transport Area would cover a 5 by 20 mile rectangular box approximately 1 to 6 nautical miles from the beach (Figure 2-1). During the 10-day exercise, ARG ships would normally remain in their assigned boxes at slow speed (5 to 10 knots) or anchor for short periods of time. Normal operations would include:

1) Launch/recovery of aircraft
2) Launch/recovery of Landing Craft Air Cushion (LCAC), Landing Craft Utility (LCU), and Advanced Amphibian Assault Vehicles (AAVs)

The ARG consists of three amphibious ships and would be augmented by two to three cruisers/destroyers. No ship-to-shore movement of ground forces is anticipated from cruisers and destroyers. All of the ARG shipping to include cruisers and destroyers could continuously maintain position within the Inner Transport Area for three to four days at a time. Ballasting of amphibious ships is required in order to launch amphibious vessels (LCAC, LCU, AAV). Ballasting operations involve the pumping of seawater into predetermined ballast tanks. This action results in the ship settling in the water to enable flooding of the welldeck. Prior to ballasting, the welldeck is inspected and cleaned to ensure no trash or other contaminants are inadvertently washed overboard when the welldeck is flooded. Once ballasted, amphibious vessels are launched.

Once amphibious vessels are recovered, deballasting operations are conducted to raise the ship back to its cruising profile. Deballasting involves the pumping of seawater from the ballast tanks back to sea, resulting in the ship rising in the water and removing all seawater from the welldeck. As the ballast tanks are used solely for seawater, there is no danger of contamination or inadvertent pumping of oil/waste products into the sea. Disposal of waste products (e.g., oily waste, plastics) would conform with federal regulations and policies. No wastes would be disposed in the water within the Inner Transport Area. There would be no impacts associated with air emissions because

of the small number of Navy vessels, and due to their slow speed, no impacts associated with marine mammals or other endangered species would occur.
Anchoring evolutions would be conducted with caution and with respect to the seabed, underwater hazards, and anchoring restrictions imposed by the Coast Guard as published on navigational charts or via weekly Notice to Mariners (NOTMARs).

ARG vessels would use passive sonar but not active sonar during ship operations.

Site/Infrastructure Improvements: None needed.

<u>MEU Aviation Operations</u>: This is a summation of all fixed and rotary wing aircraft operations that would occur during a 10-day MEU training cycle. While there is a slight potential for all aircraft to be operating simultaneously, typically there would be seven aircraft operating in a single event.

Available aircraft (total): CH-46 (12), CH-53 (6), UH-1N (2), AH-1 (4), and AV-8B (6)
Timing: can occur anytime day or night
Number of events: would travel over populated areas up to six times per day
Locations: All military controlled airspace
Site/Infrastructure Improvements: None needed.

<u>Helicopter Raid</u>: This is the rapid deployment of a 180-man infantry company from ship to shore via helicopter transport with jet aircraft escort. The helicopters would fly on designated routes to designated landing zones on the Eglin main reservation. Marines would then exit the helicopters on foot and by four-wheeled vehicles to objectives where they would conduct blank firing and deploy pyrotechnics (smoke and signaling flares). Upon completion, the transport helicopters would land, and the Marines would reboard and return to amphibious shipping. Jets and helicopters would orbit during the entire mission.

Available aircraft (total): CH-46 (12), CH-53 (6), UH-1N (2), AH-1 (4), and AV-8B (6)
Timing: can occur anytime day or night
Duration: 6 to 8 hours
Number of events: up to four events during 10-day training period
Locations: Auxiliary Fields 1-3, 6-8, and 10 (For a map, refer to Figure A-3 in the March 7, 2003 DEA) and all military-controlled airspace
Site/Infrastructure Improvements: None needed.

<u>Rapid Ground Refueling</u>: This is the use of KC-130s and/or CH-53s to refuel helicopters and vehicles. The KC-130s and CH-53s would land and deploy fuel hoses. Helicopters would land, taxi to the fueling stations, rapidly top off fuel tanks, then depart. Once all helicopters and vehicles are refueled, the fueling hoses would be retracted and the fueling aircrafts would depart.

Available aircraft (total): CH-46 (12), CH-53 (6), UH-1N (2), AH-1 (4), and KC-130 (2)
Timing: can occur anytime day or night

Number of events: up to four times during a 10-day training period
Locations: All military-controlled airspace and select auxiliary fields (For a map, refer to Figure A-4 in the March 7, 2003 DEA)
KC-130s would always be on established airfield; CH-53s can be at any established landing zone (LZ)
Site/Infrastructure Improvements: None needed.

Small Boat Raid: This is an amphibious operation involving swift incursion of an infantry company (up to 150 men) into an objective, followed by a planned withdrawal. The infantry company would move from amphibious shipping to designated beach landing sites on Santa Rosa Island and the main reservation via Zodiac boats and move on foot to objectives where they would conduct blank firing and deploy pyrotechnics (smoke and signaling flares). The Zodiac boats are pulled up onto the beach above the high water line and guarded by a few Marines throughout the training exercise. Upon completion, the Marines would return to the boats on foot and then travel back to amphibious shipping.

Duration: each event lasts 6 to 8 hours under cover of darkness
Number of events: up to four events in a 10-day training period
Delivery vehicles: up to 18 Zodiac boats carrying eight Marines per boat
Locations: Santa Rosa Island (SRI), Yellow River, East Bay River, Test Area (TA) D-84 (near TA D-84), Alaqua Point, and White Point (For a map, refer to Figure A-5 in the March 7, 2003 DEA)
Site/Infrastructure Improvements: None needed.

Amphibious Landing Rehearsal: This is an exercise to coordinate the timing of the movement of vehicles, aircraft, and landing craft from ship to shore for planning the actual MEU landing. AAVs "swim" to shore, while other tracked and wheeled vehicles are transported via landing craft (LCAC or LCU). Helicopters touch down and may discharge equipment and forces and return to ship. The landing craft would discharge and return for subsequent loads. There would potentially be 5 LCAC landings, 13 AAV landings, and 1 LCU landing. LCACs will land just west of Test Site A-13B, while AAVs could land anywhere along the beach from TA A-10 to A-15. Equipment that will remain on SRI will be left at a designated staging area. Smokes are deployed for concealment purposes. Everything would be returned to ship or remain on Santa Rosa Island for future training exercises on the main reservation.

Duration: approximately 12 hours during daylight hours
Number of events: one event per training cycle
Maximum number of aircraft (total): CH-53 (6) and CH-46 (12)
Maximum number of amphibious vehicles: AAVs (13), LCAC (5), and LCU (1)
Type and number of wheeled and tracked vehicles: Light Armored Vehicles (LAVs) (15), High Mobility Multipurpose Wheeled Vehicles (HMMWVs) (103), 7-ton trucks (35), M-198 towed howitzers (6), M1A1 tanks (4), earthmovers (2), bulldozers (2), and fuel trucks (2)
Locations: Santa Rosa Island, Hurlburt, Wynnhaven Beach, East Bay Point, TA D-84, Alaqua Point, and White Point (For a map, refer to Figure A-6 in the March 7, 2003 DEA)

Site/Infrastructure Improvements:
Santa Rosa Island
- Bury approximately 100 meters of power line along Santa Rosa Island Road near Test Site (TS) A-13B to allow for more LCAC crossing area.
- Construct a concrete crossing area on Santa Rosa Island Road near TS A-13B to accommodate tracked vehicle crossings and loading onto trucks.
- Installation of grip matting on the Sound side of SRI.

Wynnhaven Beach
- Tree clearing, site grading to shoreline, and construction of a gravel staging area to allow for amphibious craft landings and offloading.

East Bay Point
- Site grading to shoreline, tree clearing and construction of gravel staging area.
- TA D-84
- Site grading to shoreline to allow for amphibious craft landings and offloading.

Alaqua Point
- Site grading to shoreline to allow for amphibious craft landings and offloading.

White Point
- Minor tree clearing.

Hurlburt Field
- None needed.

<u>Mechanized Raid (Wet)</u>: This is an amphibious raid involving a combination of infantry, AAVs, LAVs, HMMWVs, and M1A1 tanks. This force would move from ship to shore via landing craft (LCAC or LCU) or AAV. Once ashore, the tanks, AAVs, and wheeled vehicles would maneuver to an objective, where infantry (up to 180 men) would discharge and conduct blank firing and employ pyrotechnic devices. After completion, Marines would return to amphibious shipping or remain on Eglin AFB for future training exercises.

Duration: approximately 8 to 10 hours anytime during day or night
Number of events: would occur up to two times in a 10-day training cycle
Maximum number of amphibious vehicles: AAVs (13), LCAC (5), and LCU (1)
Types and numbers of wheeled and tracked vehicles: LAVs (9), HMMWVs (7), M1A1 tanks (4)
Locations: Santa Rosa Island, Wynnhaven Beach, Hammock (TA D-84), Alaqua, White, and East Bay Points for landing, several test areas and auxiliary fields for objectives. If inland objective sites are used, all equipment would remain on land and would not return to amphibious shipping until the MEU withdrawal (For a map, refer to Figure A-7 in the March 7, 2003 DEA).
Site/Infrastructure Improvements:
Santa Rosa Island
- Bury approximately 300 feet of power line along Santa Rosa Island Road near TS A-13B to allow for more LCAC crossing area.
- Construct a concrete pad on the road near TS A-13B to accommodate tracked vehicle crossings and loading onto trucks.

Wynnhaven Beach

- Tree clearing, site grading to shoreline, and construction of a gravel staging area to allow for amphibious craft landings and offloading.

East Bay Point

- Tree clearing, site grading to shoreline, and construction of a gravel staging area to allow for amphibious craft landings and offloading.

TA D-84

- Site grading to shoreline to allow for amphibious craft landings and offloading.

Alaqua Point

- Site grading to shoreline to allow for amphibious craft landings and offloading.

White Point

- Minor tree clearing.

<u>MEU Landing</u>: This event involves moving all MEU assets from ship to the Eglin main reservation. Delivery would be accomplished using CH-46s and CH-53s, as well as LCACs and LCUs making multiple trips to shore. The AAVs would land and proceed to an objective area via a major highway crossing. Other tracked and wheeled vehicles would conduct a major highway crossing after disembarking from the landing craft. The helicopters and landing craft would land, discharge their forces and equipment, and return for subsequent loads. There would be 30 LCAC landings and 30 LCU landings. LCACs will land on SRI just west of TS A-13B, while AAVs could land anywhere along the beach from TA A-11 to A-15. Equipment that will remain on SRI will be left at a designated staging area. Total number of Marines is 2,000.

Duration: approximately 15 hours during daylight hours
Number of events: only one event per training cycle
Maximum number of aircraft (total): CH-53 (6) and CH-46 (12)
Maximum number of amphibious vehicles: AAVs (13), LCAC (5), and LCU (5)
Types and numbers of wheeled and tracked vehicles: LAVs (15), HMMWVs (103), 7-ton trucks (35), M-198 towed howitzers (6), M1A1 tanks (4), earthmovers (2), bulldozers (2), and fuel trucks (2). (A description and picture of each vehicle is included in Appendix G.)
Locations: Santa Rosa Island, Hurlburt, Wynnhaven Beach, TA D-84, Alaqua Point, White Point, Eglin Reservation Range Roads, and established landing zones (For a map, refer to Figure A-8 in the March 7, 2003 DEA)
Site/Infrastructure Improvements:

Santa Rosa Island

- Bury approximately 300 feet of power line along Santa Rosa Island Road near TS A-13B to allow for more LCAC crossing area.
- Construct a concrete pad on the road near TS A-13B to accommodate tracked vehicle crossings and loading onto trucks.
- Installation of grip matting on the Sound side of SRI.

Wynnhaven Beach

- Tree clearing, site grading to shoreline, and construction of a gravel staging area to allow for amphibious craft landings and offloading.

East Bay Point
- Tree clearing, site grading to shoreline, and construction of a gravel staging area to allow for amphibious craft landings and offloading.

Hammock Point (TA D-84)
- Site grading to shoreline to allow for amphibious craft landings and offloading.

Alaqua Point
- Site grading to shoreline to allow for amphibious craft landings and offloading.

White Point
- Minor tree clearing.

Hurlburt Field
- None needed.

Range Roads (RRs)
- RR253
  - Replace two culverts.
  - Construct maintenance turnout.
  - Replace /improve bridges #102 and 103 as necessary.
- RR 666
  - Increase curve radius.
  - Improve intersection of RR253 and RR666.
  - Replace Culvert.
  - Fill, Level, and stabilize low points in road.
- RR 815
  - Improve intersection of RR815 and Hwy 87.
  - Fill, level, and stabilize low points in roadbed.
  - Replace and install culverts.
  - Increase curve radius in road.
- RR259
  - Concrete pavement near Hwy 98 as staging area.
  - Construct parallel tank trail beside asphalt portion of road.
  - Replace culverts.
  - Construct maintenance turnout.
  - Replace bridge #93.
  - Level grade to bridge approaches.
  - Widen and improve road north of bridge #93.
  - Fill level, and stabilize low points in roadbed.
  - Straighten "S" Curve.
  - Install concrete tank crossing at RR235.
  - Widen road to 32 feet north of RR678.
- RR668
  - Replace or improve culvert.

Major Highway Crossing: In order to move forces to the Eglin main reservation, vehicles would need to cross major public highways such as HWY 98, State Road (SR) 293 (White Point Road),

and SR 20 (For a map, refer to Figure A-9 in the March 7, 2003 DEA). Tracked and wheeled vehicles would cross HWY 98, and wheeled vehicles would cross HWY 20 and White Point Road. Because tracked vehicles destroy asphalt, it is necessary to place tires on the road for the tracked vehicles to drive over. The time required to lay down tires, conduct crossover, pull up tires, and sweep debris from roads is estimated at 30 minutes. Wheeled vehicles can cross quickly, with no preparatory or cleanup time required. Three waves of tracked vehicles would be needed for both ingress and egress over HWY 98, with each wave taking 30 minutes. These are maximum totals for all activities combined.
Site/Infrastructure Improvements: Any long-term improvements to major highways for facilitating training activities will be evaluated in future documentation.

Mechanized Raid (Dry): This is very similar to the Mechanized Raid (Wet) but differs in that it would be initiated from a forward operating base already established on the Eglin main reservation rather than involving an amphibious assault from sea. The 180-man infantry raid force would move to an objective via tracked and wheeled vehicles where infantry would discharge and conduct blank firing and employ pyrotechnic devices. Upon completion of the mission, the Marines would return to the operating base.

Duration: approximately 8 to 10 hours anytime during day or night
Number of events: would occur up to two times in a 10-day training cycle
Types and numbers of wheeled and tracked vehicles: AAVs (13), LAVs (9), HMMWVs (7), M1A1 tanks (4)
Locations: Eglin Reservation Range Roads, B-75, B-12, B-70 (For a map, refer to Figure A-7 in the March 7, 2003 DEA)
Site/Infrastructure Improvements: None needed.

SACEX: For this training event, 250 ground-based Marines call in live fire to an established munitions range. Marines travel in wheeled vehicles or by foot. Spotters, forward observers, and forward air controllers would employ laser rangefinders/designators in the impact area. Major weapon systems would include 60- and 81-millimeter mortars, 155-millimeter howitzers, AH-1W and UH-1N gunships, and fixed-wing aircraft (AV-8B and F/A-18).
Available aircraft (total): UH-1N (2), AH-1 (4), F/A-18 (6), and AV-8B (6)
Duration: firing window from noon to midnight each day for a 72-hour period
Number of events: would only occur once during 10-day training period. The types and amounts of munitions involved are given in Appendix H
Locations: C-52 (For a map, refer to Figure A-10 in the March 7, 2003 DEA)
Site/Infrastructure Improvements: None needed

Live Fire and/or Maneuver: Eight hundred Marines would conduct static live fire and/or live fire with maneuver into established live fire areas. This force would operate on multiple ranges in groups of up to 135 men. This event includes fire and maneuver of the M1A1, AAV, LAV, HMMWV-mounted TOW missiles, heavy machine gun vehicles, small arms and tracers. Forces would sleep on their packs in the vicinity of firing ranges.

Duration: 72 hours
Number of events: once during 10-day training period
Types and numbers of wheeled and tracked vehicles: AAVs (13), LAVs (9), HMMWVs (7), M1A1 tanks (4), 7-ton trucks (20). The types and amounts of munitions involved are given in Appendix H
Locations: B-75, B-5, B-12, A-77, C-72, B-70, B-71, A-78, A-79, B-7, B-82, B-76, C-62, C-53, C-5, C-52, B-6 (for wheeled vehicle maneuvering) (Figure A-11)
Site/Infrastructure Improvements: None needed.

Direct Action: This involves short-duration strikes and other small-scale offensive action to seize, destroy, capture, recover, or inflict damage on designated personnel or material. A group of approximately 75 Marines would be inserted to the target area by helicopter or small boat. The event would begin with a live fire, long-range sniper shot into a target building. An explosion designed to remove a door or create some other means of entry into the target building would immediately follow this. A close-quarters battle force would enter the building and move from room to room conducting live fire into pre-positioned targets. All live fire would be into bullet traps. Once the entire building had been cleared of "enemy," the forces would withdraw from the site by helicopter or small boat.

Duration: 6 to 8 hours
Number of events: would only occur once during 10-day training period, usually at night
Possible locations: Santa Rosa Island (For a map, refer to Figure A-12 in the March 7, 2003 DEA)
Site/Infrastructure Improvements: None needed.

Noncombatant Evacuation Operation: This is an operation that is directed by the State Department whereby noncombatants are evacuated from foreign countries to safe havens or the United States when their lives are endangered by war, civil unrest, or natural disaster. Up to 300 Marines would come ashore by helicopter and/or landing craft and establish a processing and evacuation site(s), normally in the vicinity of the U.S. embassy/consulate compound. Over 24 to 36 hours, the Marines would collect role players from various locations and bring them to the processing/evacuation sites by wheeled tactical vehicles or civilian vehicles. They would then process the individuals for evacuation and evacuate them by helicopter and landing craft. In order to evacuate approximately 150 to 200 role players, multiple take-offs and landings of transport helicopters (CH-46 & CH-53), LCUs, and LCAC would occur during this training exercise. Established roads and landing zones would be used.

Duration: 24 to 36 hours
Number of events: once during 10-day training period
Maximum number of aircraft (total): CH-53 (6) and CH-46 (12)
Possible Locations: Eglin Main Base (A-22), Duke Field, Choctaw Field, B-12, Hurlburt GOS, B-6 (For a map, refer to Figure A-13 in the March 7, 2003 DEA)
Site/Infrastructure Improvements: None needed.

Tactical Exercise Control Group/Opposing Force (TECG/OPFOR) Requirements: This is a tactical exercise. The control group would arrive 1 week prior to the 10-day training event. This 350-man group is responsible for all aspects of the design and control of the exercise. Included in this group would be about 20 representatives from the State Department and other government agencies. Marines would act as role players and opposing forces. They would require a building with Non-classified Internet Protocol Router Network (NIPRNet) and Secret Internet Protocol Router Network (SIPRNet) capability, phone lines, electricity and plumbing. The preferred billeting for the Marines would be a barracks on base. Access to the local economy (e.g., hotels, rental cars, restaurants) may be required for administrative support.

Possible Location: C-1 for command, various auxiliary fields and test areas for opposing forces
Site/Infrastructure Improvements: None needed.

Withdrawal: During a 10-day training cycle, this event would occur once, with forces withdrawing during daylight hours. Expected duration is 15 hours. This event is a reverse of the MEU Landing described above and would use the same locations as for the insertion (See "MEU Landing" description for details). (For a map, refer to Figure A-14 in the March 7, 2003 DEA)

Duration: approximately 15 hours during daylight hours
Number of events: only one event per training cycle
Maximum number of aircraft (total): CH-53 (6) and CH-46 (12)
Maximum number of amphibious vehicles: AAVs (13), LCAC (5), and LCU (5)
Types and numbers of wheeled and tracked vehicles: LAVs (15), HMMWVs (103), 7-ton trucks (35), M-198 towed howitzers (6), M1A1 tanks (4), earthmovers (2), bulldozers (2), and fuel trucks (2)
Locations: Santa Rosa Island, Hurlburt, Wynnhaven Beach, East Bay Point, TA D-84, Alaqua Point, White Point, Eglin Reservation Range Roads, and established landing zones (Figure A-8)
Site/Infrastructure Improvements: Site improvements would be the same as those required for the MEU Landing exercise.

The proposed activities listed above involve one or more of the following basic elements that are the considered the building blocks of MEU training: amphibious landings, ground movement, aviation operations, munitions use, and pyrotechnics. A brief summary of these basic elements is given below:

Amphibious landings: This is the ship-to-shore movement of landing crafts (landing craft air cushion [LCAC] and landing craft utility [LCU]), amphibious assault vehicles, and small boats (Zodiacs). The landing crafts are used to transport all nonamphibious vehicles along with other equipment and troops.

Ground movement: This is the movement of tracked and wheeled vehicles and troops on foot from landing sites to objective areas, from objective area to objective area, and from objective areas back

to amphibious shipping (during withdrawal).

Aviation operations: This is the delivery of troops and equipment from ship to shore via a variety of helicopters that would land at designated landing zones scattered throughout the Eglin reservation and might include a fixed-wing escort. Aviation operations also occur during live fire exercises and could include weapons delivery from F/A-18 and A/V-8A aircraft.

Munitions use: This is live fire from ground-based troops and vehicles as well as air-delivery of larger munitions. This also includes the use of blank munitions during raids.

Pyrotechnics use: Raids on objective sites with opposing forces acting as resistance involves the use of pyrotechnics (smokes and flares). Additionally, the amphibious assault vehicles (AAVs) deploy smoke when traveling from ship to shore.

Conservation Measures

Eglin NRB has proposed to implement the following measures to avoid and minimize impacts to federally listed species from conducting ARG/MEU activities on Eglin AFB. These measures were developed in cooperation with Eglin NRB and the Service. These measures are given below for each federally listed species on Eglin AFB that could potentially be effected by the MEU training.

All Federally Listed Species

Prior to conducting MEU activities, personnel will be given an educational overview of federally listed species occurring on Eglin. This overview will give a description of each listed species, habitats where the species could be encountered, and obligations under the Endangered Species Act. A summary of appropriate Conservation Measures and Reasonable and Prudent measures to avoid impact to each species as discussed in this biological opinion will also be included. The educational overview will be prepared by Eglin NRB.

Red-cockaded Woodpecker (RCW)

1. Eglin NRB would evaluate the current monitoring plan that is in place for RCW to determine the effectiveness of identifying the impacts (if any) of MEU training on the RCW. If the current design is inadequate, then the monitoring protocol would be redesigned in order to identify impacts.

2. As part of a component plan for the current Integrated Natural Resource Management Plan, Eglin NRB would complete an Endangered Species Management Plan for the RCW by December 31, 2004.

3. Two hundred foot buffer zones would be marked around RCW clusters using an 18 inch wide white band painted on trees and/or posted signs according to established protocol. If because

of logistics and time constraints, all clusters cannot be marked prior to the first exercise, then the remaining clusters would be marked prior to the second exercise. In consultation with the Service, Eglin NRB would also evaluate alternate method for identifying and protecting clusters on the ground. Eglin would consult with the Service before implementation of any alternate method.

4. During MEU activities, no long leaf pine trees greater than 5 feet in height would be cut or destroyed within active clusters and their foraging areas.

5. During the road widening project on RR259, the widening would be adjusted so that active cavity trees would be avoided and removal of pines minimized.

6. MEU activities within RCW 200 foot buffer zones would be limited to those transient in nature. Transient activities involve maneuver type training, have low intensity human activity, and short term human presence of less than two hours.

7. No digging/excavating or bivouacking would take place within 200 feet of identified RCW cavity trees.

8. Only transient foot traffic and vehicle traffic on established trails/roads are allowed within 200 feet of active RCW trees.

9. 60- and 81-mm mortars would only be fired at a distance greater than 656 feet (200 meters) from any identified active RCW tree.

10. Firing of the 155-mm Howitzer on Test Area C-72 would be conducted at least 1,000 feet from the southeast boundary.

11. Pyrotechnics use would follow Eglin's Wildfire Specific Action Guide Restrictions.

Based on the information provided in the project, BA, DEA, Supplemental information, and with the implementation of the above Conservation Measures, we concur that the ARG/MEU training is not likely to adversely affect the RCW. Failure to implement the Conservation Measures would result in the need to reinitate consultation for the RCW. Additional information on reinitation is provided in the Reinitiation Notice of this BO on page 70. This species would not be further addressed in this BO.

<u>Eastern Indigo Snake</u>

1. MEU personnel as part of an educational overview of all federally listed species on Eglin would be provided a description of the eastern indigo snake, its habits, and protection under the Endangered species Act.

2. MEU personnel would receive instructions not to injure, harm, or kill this species.

3. Should an eastern indigo snake be sighted, MEU personnel would be directed to cease any activities and allow the snake sufficient time to move away from the site in its own, before resuming activities.

4. To the extent possible, gopher tortoise burrows would be avoided.

Based on the information provided in the project BA, DEA, Supplemental Information, and with the implementation of the above Conservation Measures, we concur that the ARG/MEU training is not likely to adversely affect the eastern indigo snake. Failure to implement the Conservation Measures would result in the need to reinitate consultation for the eastern indigo snake. Additional information on reinitation is provided in the Reinitation Notice of this BO on page 70. This species would not be further addressed in this BO.

Bald Eagle

1. MEU activities would be consistent with the "Habitat Management Guidelines for the Bald Eagle in the Southeast Region."

Based on the information provided in the project BA, DEA, Supplemental Information, and with the implementation of the above Conservation Measures, we concur that the ARG/MEU training would not affect the bald eagle. Failure to implement the Conservation Measures would result in the need to reinitate consultation for the bald eagle. Additional information on reinitation is provided in the Reinitation Notice of this BO on page 70. This species would not be further addressed in this BO.

Okaloosa Darter

1. Vehicles and troops would use established roads, rails, and bridges near Okaloosa darter streams.

2. Vehicles and troops would avoid activities such as driving, digging, or other soil disturbing activities on steep slopes near Okaloosa darter streams and in newly restored areas adjacent to Okaloosa darter streams. Coordination with Eglin NRB prior to training activities will insure that these areas are avoided.

3. Ground disturbance from troop crossings near Okaloosa darter streams would be minimized and restored if needed.

4. Operations would be conducted in accordance with guidelines in the Range Road Maintenance Guidebook and the Test Area Maintenance Programmatic Environmental Assessment.

5. Pyrotechnics use would follow Eglin's Wildfire Specific Action Guide Restrictions.

Based on the information provided in the project BA, DEA, Supplemental Information, and with the implementation of the above Conservation Measures, we concur that the ARG/MEU training is not likely to adversely affect the Okaloosa darter. Failure to implement the Conservation Measures would result in the need to reinitate consultation for the Okaloosa darter. Additional information on reinitation is provided in the Reinitation Notice of this BO on page 70. This species would not be further addressed in this BO.

Gulf Sturgeon

1. To minimize bottom scaring, only established landings on the Yellow River would be utilized.

2. Seagrass beds would be avoided to the extent practicable.

Based on the information provided in the project BA, DEA, Supplemental Information, and with the implementation of the above Conservation Measures, we concur that the ARG/MEU training would not effect the Gulf sturgeon or its Critical Habitat. Failure to implement the Conservation Measures would result in the need to reinitate consultation for the Gulf sturgeon. Additional information on reinitation is provided in the Reinitation Notice of this BO on page 70. This species would not be further addressed in this BO.

Piping Plover

1. Ensure that all activities occur outside of designated piping plover critical habitat.

2. Limit large-scale troop movements to areas away from fragile foraging habitat on the north shore of SRI.

3. Use only designated landing areas for amphibious operations on the north side of SRI (A-12 and A-13B).

4. If the Proposed Action is scheduled during the non-breeding season between July 15 and May 15, thorough shorebird surveys will be conducted immediately before and after the action, along the south and north shores of SRI, and within vehicular movement corridors.

5. If piping plovers are documented in the Proposed Action areas, measures will be taken to mark and protect the habitat and troop/vehicular movements would be adjusted accordingly.

6. Conduct annual piping plover surveys for all Eglin properties on SRI and continue participation in the International Piping Plover Census if conducted every five years.

Based on the information provided in the project BA, DEA, Supplemental Information, and with the implementation of the above Conservation Measures, we concur that the ARG/MEU training would not likely adversely affect the piping plover or its designated critical habitat. Failure to implement

the Conservation Measures would result reinitation of consultation for the piping plover. Additional information on reinitation is provided in the Reinitation Notice of this BO on page 70. This species will not be further addressed in this BO.

Florida Perforate Lichen

1. Lichen populations and surrounding suitable habitat will be fenced and flagged using infrared tape with a 10-foot buffer to prevent inadvertent trampling of lichen mats.

2. Monitoring will be conducted immediately before and after the first cycle of MEU operations to ensure no effect.

3. If populations were unaffected after the first MEU cycle, annual population monitoring will continue as scheduled.

4. In the event that monitoring shows an expansion of the local range of the species, the fenced area will be expanded accordingly.

Based on the information provided in the project, BA, DEA, Supplemental information, and with the implementation of the above Conservation Measures, we concur that the ARG/MEU training is not likely to adversely affect the Florida perforate lichen. Failure to implement the Conservation Measures would result in the need to reinitiate consultation for the RCW. Additional information on reinitation is provided in the Reinitiation Notice of this BO on page 70. This species will not be further addressed in this BO.

Sea Turtles

Amphibious Landing Avoidance and Minimization Measures

1. The size of night landings corridors will be limited to the minimum needed to accomplish mission (Figure A-39, Appendix A).

2. Proposed landing corridors will be marked so as to be easily distinguished by the operators of amphibious landing vehicles/craft.

3. All landing areas will be surveyed immediately prior to night operations.

4. All known sea turtle nests will be marked and protected in accordance with established Eglin Natural Resources Branch protocol. An additional 10-foot boundary will be marked around the nests occurring within the proposed action area (Figure A-39) using infrared tape. *The Service has determined that nest relocation is appropriate; however, since the nests are to be relocated to outside the 7-mile ARG/MEU Training area, the additional 10-foot buffer around the marked nests are not needed to ensure protection of the nests.*

5. All nests within landing corridors will be relocated at least 50 feet from the movement corridor to the toe of the nearest primary dune. *The Service has determined that relocation is appropriate; however, nests are to be relocated to outside the 7-mile ARG/MEU Training area.*

6. During nighttime activities, surveyors will be posted at any nest that is beyond 50 days of incubation and less than 0.5 miles from the landing area. *The Service has determined that since nest would be relocated outside of the 7-mile ARG/MEU Training area, it is not necessary to have surveyors at the nests during nighttime operations.*

7. Whenever practicable, watercraft staged on the beach will be placed at the water's edge.

8. When watercraft and vehicles are staged on the beachfront during nighttime operations, a surveyor would be posted at the staging area to prevent nesting females from becoming entrapped among the staged craft. *The Service has determined that since nest would be relocated outside of the 7-mile ARG/MEU Training area, it is not necessary to have surveyors at the nests during nighttime operations unless the watercraft and vehicles will be on the beach for one night or more.*

9. All lighting on the beach will be beach reduced to the extent practicable through use of blinders and low-level lighting.

10. When ARG/MEU amphibious landing on SRI occur between 1 May and 1 September, sea turtle surveys will be conducted every morning in accordance with established INBS and Eglin NRB protocol.

Ground Movement Avoidance and Minimization Measures

1. The size of vehicular movement corridors will be limited to the minimum necessary for the mission. Lateral movement along the beachfront would only occur between test sites A-15 and A-11A, as close to the waterline as possible and at least 50 feet below the primary dune line.

2 Proposed landing corridors will be marked so as to be easily distinguished by the operators of amphibious landing vehicles/craft.

3. To protect sea turtle nesting habitat within movement corridors, all vehicles and troops will avoid all dunes over 5 feet high.

4. All nests that are laid within crossover and access corridors (A-13B, A-11-A, and A-10) will be relocated laterally along the primary dune line to a site at least 50 feet away from all vehicular movement corridors. *The Service has determined that relocation is appropriate; however, nests will be relocated to outside the 7-mile ARG/MEU Training area.*

5. Nests occurring less than 50 feet above the water line between A-13B and A-11A will be

relocated northward to the toe of the nearest primary dune. *The Service has determined that relocation is appropriate; however, nests will be relocated to outside the 7-mile ARG/MEU Training area.*

6. Nests occurring between A-13B and A-11A where mean high water (MHW) is less than 50 feet from the primary dune line will be relocated to the primary dune line where MHW is at least 50 feet away. *The Service has determined that relocation is appropriate; however, nests are to be relocated to outside the 7-mile ARG/MEU Training area.*

7. All known turtle nests will be marked and protected in accordance with established Eglin Natural Resources Branch protocol. An additional; 10-foot boundary would be marked around all nests occurring within the proposed action area (Figure A-39) using infrared tape. *The Service has determined that nest relocation is appropriate; however, since the nests are to be relocated to outside the 7-mile ARG/MEU Training area, the additional 10-foot buffer around the marked nests are not needed to ensure protection of the nests.*

8. Movement corridors will be surveyed immediately prior to all nighttime operations on the beachfront.

9. During nighttime operations, a surveyor will be posted by all nests beyond 50 days of incubation that are less than 0.5 miles from the area of activity. *The Service has determined that since nest would be relocated outside of the 7-mile ARG/MEU Training area, it is not necessary to have surveyors at the nests during nighttime operations.*

10. To the extent practicable, vehicles and watercraft will be staged at the water's edge. Whenever it is necessary to stage vehicles or watercraft on the beachfront, silt screens will be installed around the base of the vehicles and will be removed immediately following the operation completion.

11. All ruts deeper than 2 inches created during daytime operations will be removed before sunset. All such ruts created during the night operations would be removed immediately following the operation completion.

12. When MEU ground movements on SRI occur between 1 May and 1 September, sea turtle surveys will be conducted every morning in accordance with established INBS and Eglin NRB protocol.

Based on the information provided in the project BA, DEA, Supplemental Information, and with the implementation of the above Conservation Measures, we concur that the ARG/MEU training would likely adversely affect nesting and hatchling sea turtles. Four species of nesting sea turtles will be addressed further in the biological opinion.

Action Area

The Action Area for this consultation consists of the Eglin Military Complex or Eglin Air Force Base (AFB). The Integrated Natural Resource Management Plan for Eglin AFB 2002-2006 (INRMP) states that "Eglin Air Force Base is the largest military reservation in the United States consisting of approximately 464,000 acres in northwest Florida." Found in Santa Rosa, Okaloosa, and Walton counties, Eglin occupies 724 square miles of land area in the Florida panhandle. Over the Gulf of Mexico, Eglin AFB controls 124,642 miles of air space. The land area of the Eglin Military Complex is comprised of test areas and interstitial areas (the areas between the test areas). Proposed MEU activities would occur within both the test areas and interstitial areas.

Eglin is found within the Northeast Gulf Plains Ecoregion. Within this Ecoregion, Eglin occupies three physiographic provinces; the Coastal Barrier Island Chain, Coastal Lowlands, and Western Highlands. The BA identifies five broad ecological associations on Eglin; the Sandhills, Wetland/Riparian, Flatwoods, Barrier Island, and Grassland/Shrub. Each ecological association includes a number of natural plant and animal communities and rare, threatened, and endangered species.

The test areas are mainly dominated by the Grassland/Shrub ecological association. This habitat on test areas is maintained by machinery or fire. The Grassland/Shrub association is not common within the interstitial areas, although some portions of the interstitial areas have been cleared and consequently have become grassland/shrublands (i.e., Duke Field and auxiliary fields)

The Sandhills ecological association is the largest ecological association within the interstitial areas. The Sandhills association covers 78 percent of the Eglin reservation. Mechanically established longleaf pine , slash pine and sand pine plantations are found throughout this association. The longleaf pine forest component of this association is globally, very rare. Eglin's INRMP states that "as little as 0.5 percent of old growth longleaf pine forest remain globally and Eglin's Sandhills contain more than 90 percent of these remnant stands".

Those remaining portions of the interstitial areas not in the Sandhills or Grassland /Shrub associations are in different vegetative communities within the Wetland/Riparian, Flatwoods, Barrier Island associations.

Santa Rosa Island (SRI) comprises the Barrier Island ecological association at Eglin. SRI, located in the southern section of Eglin AFB in Okaloosa County and Santa Rosa County, Florida, is a narrow barrier island approximately 50 miles long and less than 0.5 mile wide. SRI is separated from the northwest Florida mainland by Santa Rosa Sound, a shallow lagoon varying in width from 400 to nearly 5,000 feet. SRI is bordered on the south by the Gulf of Mexico and on the north by Santa Rosa Sound, and on the east by Destin Pass/Choctawhatchee Bay. Eglin controls 17 miles (4,760 acres) of SRI, a 4-mile strip open for public recreation and a restricted access 13-mile section. There are 2.5 miles of Okaloosa County property between the two parcels of Eglin property. There are 15 test sites located on SRI. Appendix F (Ecological Association Descriptions) of the DEA notes that "the beach dune and coastal strand communities are the most predominate vegetative communities present in each of these units."

The surf zone area is also considered part of the action area. The BA defines the surf zone as a shallow area covering the continental shelf seaward of SRI to a depth of approximately 30 feet. The distance from the SRI shore line, which corresponds to this depth, varies from approximately 0.5 miles at the western side of the Air Force property to 1.5 miles at the eastern side extending out into the inner continental shelf.

STATUS OF THE SPECIES/CRITICAL HABITAT

This section summarizes the biology and ecology of the sea turtles and the flatwoods salamander. Information regarding the status and trends of the individual threatened and endangered species throughout the entire range of each is included. The Service uses this information to assess whether a federal action is likely to jeopardize the continued existence of this species. The **"Environmental Baseline"** section summarizes information on status and trends of the species specifically within the action area. These summaries provide the foundation for the Service's assessment of the effects of the proposed action, as presented in the "**Effects of Action**" section, and to make the **Conservation Recommendations** listed at the end of this opinion.

Sea Turtles

The Service has responsibility for implementing recovery of sea turtles when they come ashore to nest. The National Oceanic and Atmospheric Administration-Fisheries (NOAA-Fisheries) has jurisdiction over sea turtles in the marine environment. This biological opinion addresses nesting sea turtles and hatchlings only.

Four species of sea turtles are analyzed in this biological opinion: the loggerhead sea turtle (*Caretta caretta*), the green sea turtle (*Chelonia mydas*), the leatherback sea turtle (*Dermochelys coriacea*), and the Kemp's ridley sea turtle (*Lepidochelys kempii).*

Species/critical habitat description

Loggerhead Sea Turtle

The loggerhead sea turtle (*Caretta caretta*) was federally listed as a threatened species throughout its range in the United States (U.S.) on July 28, 1978 (43 FR 32800). No critical habitat has been designated for the loggerhead sea turtle.

The loggerhead sea turtle is characterized has a large head with blunt jaws and grows to an average weight of about 200 pounds. The loggerhead feeds on mollusks, crustaceans, fish, and other marine animals.

The loggerhead sea turtle inhabits the continental shelves and estuarine environments along the margins in the temperate and tropical regions of the Atlantic, Pacific, and Indian Oceans. Major nesting beaches are located in the Sultanate of Oman, southeastern U.S., and eastern Australia. The species is widely distributed within its range. It may be found hundreds of miles out to sea, as well as in inshore areas such as bays, lagoons, salt marshes, creeks, ship channels, and the mouths of large rivers. Coral reefs, rocky places, and ship wrecks are often used as feeding areas. Nesting occurs mainly on open beaches or along narrow bays having suitable sand, and often in association with other species of sea turtles.

Recovery Criteria for the United States

The southeastern U.S. population of the loggerhead can be considered for delisting if, over a period of 25 years, the following conditions are met:

1. The adult female population in Florida is increasing and in North Carolina, South Carolina, and Georgia, it has returned to pre-listing levels (NC-800, SC - 10,000, and GA - 2,000 nests per season). The above conditions must be met with the data from standardized surveys which would continue for at least five years after delisting.

2. At least 25 percent (348 miles) of all available nesting beaches (1,400 miles) is in public ownership, distributed over the entire nesting range and encompassing at least 50 percent of the nesting activity in each state.

3. All priority one tasks identified in the recovery plan have been successfully implemented.

Green Sea Turtle

The green sea turtle (*Chelonia mydas*) was federally listed as a protected species on July 28, 1978 (43 FR 32800). Breeding populations of the green turtle in Florida and along the Pacific Coast of Mexico are listed as endangered; all other populations are listed as threatened. Critical habitat for the green sea turtle has been designated for the waters surrounding Culebra Island, Puerto Rico, and its outlying keys (50 CFR 226.72).

The green sea turtle grows to a maximum size of about 4 feet and a weight of 440 pounds. It has a heart-shaped shell, small head, and single-clawed flippers. Hatchling green turtles eat a variety of plants and animals, but adults feed almost exclusively on seagrasses and marine algae.

The green sea turtle has a worldwide distribution in tropical and subtropical waters. They are generally found in fairly shallow waters (except when migrating) inside reefs, bays, and inlets. The sea turtle is attracted to lagoons and shoals with an abundance of marine grass and algae.

Major green turtle nesting colonies in the Atlantic occur on Ascension Island, Aves Island, Costa Rica, and Surinam. Open beaches with a sloping platform and minimal disturbance are required for nesting.

Recovery Criteria for the United States

The U.S. population of green sea turtles can be considered for delisting if, over a period of 25 years, the following conditions are met:

1. The level of nesting in Florida has increased to an average of 5,000 nests per year for at least six years. Nesting data must be based on standardized surveys.

2. At least 25 percent (65 miles) of all available nesting beaches (260 miles) is in public ownership and encompasses at least 50 percent of the nesting activity.

3. A reduction in stage class mortality is reflected in higher counts of individuals on foraging grounds.

4. All priority one tasks identified in the Recovery Plan have been successfully implemented.

Leatherback Sea Turtle

The leatherback sea turtle (*Dermochelys coriacea*) was federally listed as an endangered species throughout its range in the U.S. on June 2, 1970 (35 FR 8491). Marine and terrestrial critical habitat for the leatherback sea turtle has been designated at Sandy Point on the western end of the island of St. Croix, U.S. Virgin Islands (50 CFR 17.95).

This is the largest, deepest diving, and most migratory and wide ranging of all sea turtle species. The adult leatherback can reach 4 to 8 feet in length and weighing 500 to 2,000 pounds. Jellyfish are the main staple of its diet, but it is also known to feed on sea urchins, squid, crustaceans, tunicates, fish, blue-green algae, and floating seaweed.

The leatherback sea turtle is distributed worldwide in tropical and temperate waters of the Atlantic, Pacific, and Indian Oceans. Non-breeding leatherbacks have been recorded as far north as British Columbia, Newfoundland, the British Isles, and the Maritime Provinces of Canada and as far south as Argentina and the Cape of Good Hope (Pritchard, 1992).

Leatherback turtles nest on shores of the Atlantic, Pacific and Indian Oceans. Adult females require sandy nesting beaches backed with vegetation and sloped sufficiently so the distance to dry sand is limited. Their preferred beaches have proximity to deep water and generally rough seas.

Recovery Criteria for the United States

The U.S. population of leatherbacks can be considered for delisting if the following conditions are met:

1. The adult female population increases over the next 25 years, as evidenced by a statistically significant trend in the number of nests at Culebra, Puerto Rico, St. Croix, U.S. Virgin Island, and along the east coast of Florida.

2. Nesting habitat encompassing at least 75 percent of nesting activity in U.S. Virgin Islands, Puerto Rico, and Florida is in public ownership.

3. All priority one tasks identified in the recovery plan have been successfully implemented.

<u>Kemp's Ridley Sea Turtle</u>

The Kemp's ridley sea turtle (*Lepidochelys kempii*) has received protection in Mexico since the 1960's and was federally listed as an endangered species throughout its range in the U.S. on December 2, 1970 (35 FR 18319). No critical habitat has been designated for the Kemp's ridley sea turtle.

This is one of the smallest of the sea turtle species, with adults reaching about 2 feet in length and weighing up to 100 pounds. This turtle is a shallow water bottom feeder with a diet consisting primarily of crabs.

The range of the Kemp's ridley includes the Gulf coasts of Mexico and the U.S., and the Atlantic coast of North America as far north as Nova Scotia and Newfoundland (Pritchard, 1989; Marquez, 1994 as cited in Turtle Expert Working Group 1997 and 1998). They also have been reported from Bermuda, European Atlantic waters, the Mediterranean Sea, Madeira, the Azores, and Nicaragua

(Marquez, 1994 as cited in Turtle Expert Working Group 1997 and 1998; Service and NMFS, 1992). They are found in nearshore and inshore waters of the northern Gulf of Mexico, especially Louisiana waters. A predominant habitat includes salt marshes.

Most Kemp's ridleys nest on the coastal beaches of the Mexican states of Tamaulipas and Veracruz, although a very small number of Kemp's ridleys nest consistently at Padre Island National Seashore, Texas. The preferred sections of nesting beach are backed up by extensive swamps or large bodies of open water having seasonal narrow ocean connections.

Recovery Criteria for the United States

The goal of this plan is the recovery of the population so that the species can be reduced from endangered to threatened status. The Recovery Team members feel that the criteria for a complete removal of this species from the endangered species list need not be considered here, but rather left for future revisions of the plan. Complete removal from the Federal list would certainly necessitate that some other instrument of protection, similar to the Marine Mammal Protection Act, be in place and be international in scope. Kemp's ridley can be considered for downlisting to threatened under the ESA if the following four criteria are met:

1. To continue complete and active protection of the known nesting habitat, and the waters adjacent to the nesting beach (concentrating on the Ranch Nuevo area) and continue the bi-national project.

2. To essentially eliminate mortality from incidental catch in commercial shrimping in the U.S. and Mexico through the use of Turtle Excluder Devices (TEDs) and to achieve full compliance with the regulations requiring TED use.

3. To attain a population of at least 10,000 females nesting in a season.

4. To successfully implement all priority one recovery tasks in the recovery plan.

Life history (growth, life span, survivorship, and mortality)

<u>Loggerhead Sea Turtle</u>

Loggerheads are known to nest from one to seven times within a nesting season (Talbert *et al.*, 1980; Richardson and Richardson, 1982; Lenarz et al., 1981; among others); the mean is about 4.1 times (Murphy and Hopkins, 1984). The interval between nesting events within a season varies around a mean of about 14 days (Dodd, 1988). Mean clutch size varies from about 100 to 126 eggs along the southeastern U.S.Coast (NMFS and Service, 1991a). Nesting migration intervals of two to three years are most common in loggerheads, but the number can vary from one to seven years (Dodd, 1988). Age at sexual maturity is believed to be about 20 to 30 years (Turtle Expert Working Group, 1998).

Green Sea Turtle

Green turtles deposit from one to nine clutches within a nesting season, but the overall average is about 3.3. The interval between nesting events within a season varies around a mean of about 13 days (Hirth, 1997). Mean clutch size varies widely among populations. Average clutch size was 136 eggs in 130 clutches for one beach in Florida (Witherington and Ehrhart, 1989). Only occasionally do females produce clutches in successive years. Usually two, three, four, or more years intervene between breeding seasons (NMFS and Service, 1991b). Age at sexual maturity is believed to be about 20 to 50 years (Hirth, 1997).

Leatherback Sea Turtle

Leatherbacks nest an average of five to seven times within a nesting season, with an observed maximum of 11 (NMFS and Service, 1992). The interval between nesting events within a season is about nine to ten days. Average clutch size reported on one beach in Florida is 101 eggs (Martin, 1992). Nesting migration intervals of two to three years were observed in leatherbacks nesting on the Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands (McDonald and Dutton, 1996). Leatherbacks are believed to reach sexual maturity in six to ten years (Zug and Parham, 1996).

Kemp's Ridley Sea Turtle

Kemp's ridley sea turtles nest an average of one to four times in a season. The interval between nesting events is between 10 to 28 days. Females swarm to mass nesting emergences, known as *arribadas* or *arribazones*, to nest during daylight hours. Clutch size averages 110 eggs. Some females breed annually. Age at sexual maturity is believed to be between 7 to 15 years (Service and NMFS, 1992; Eckert et al., 1999).

Population dynamics

Loggerhead Sea Turtle

Loggerhead sea turtles nest within the continental U.S. from Louisiana to Virginia. Major nesting concentrations in the U.S. are found on the Atlantic and Gulf coasts of Florida and on the coastal islands of North Carolina, South Carolina, and Georgia (Hopkins and Richardson, 1984). From a global perspective, the southeastern U.S. nesting aggregation is of primary importance to the survival of the species because it is second in size only to nesting on islands in the Arabian Sea off Oman (Ross,1982; Ehrhart, 1989; NMFS and Service, 1991a). The status of the Oman colony has not been evaluated recently, but its location in a part of the world that is vulnerable to disruptive events (e.g., political upheavals, wars, catastrophic oil spills) causes considerable concern (Meylan *et al.* 1995). The loggerhead nesting groups in Oman, the southeastern U.S., and Australia account for about 88 percent of nesting worldwide (NMFS and Service, 1991a). Total estimated nesting in the southeastern U.S. is approximately 50,000 to 70,000 nests per year (NMFS and Service, 1991a).

However, in some years the number of nests have been higher, for example, in 1998, there were over 80,000 nests in Florida alone. About 80 percent of loggerhead nesting in the southeastern U.S. occurs in six Florida Atlantic coast counties - Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward counties (NMFS and Service, 1991a).

Adult loggerheads are known to migrate long distances between foraging areas and nesting beaches. During non-nesting years, adult females from U.S. beaches are distributed in waters off the eastern U.S. and throughout the Gulf of Mexico, Bahamas, Greater Antilles, and Yucatán,

Most loggerhead hatchlings originating from U.S. beaches are believed to spend their time in the open ocean of the North Atlantic gyre for an extended period of time, perhaps as long as 10 to 12 years, and are best known from the eastern Atlantic near the Azores and Madeira. Post-hatchlings have been found floating in association with *Sargassum* rafts. Once they become juveniles, they begin migrating to coastal areas in the western Atlantic where they become bottom feeders in lagoons, estuaries, bays, river mouths, and shallow coastal waters. These juveniles occupy coastal feeding grounds for a decade or more before maturing and making their first reproductive migration, the females returning to their birth beach to nest.

Green Sea Turtle

About 200 to 1,100 females are estimated to nest on beaches in the continental U.S. producing 200 to 10,000 nests. In the U.S. Pacific, over 90 percent of nesting throughout the Hawaiian archipelago occurs at the French Frigate Shoals, where about 200 to 700 females nest each year. Elsewhere in the U.S. Pacific, nesting takes place at scattered locations in the Commonwealth of the Northern Marianas, Guam, and American Samoa. In the western Pacific, the largest green turtle nesting group in the world occurs on Raine Island, Australia, where thousands of females nest nightly. In the Indian Ocean, major nesting beaches occur in Oman where 6,000 to 20,000 females are reported to nest annually.

Within the U.S., green turtles nest in small numbers in the U.S. Virgin Islands and Puerto Rico, and in larger numbers along the east coast of Florida, particularly in Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward Counties (NMFS and Service, 1991b). Nesting also has been documented along the Gulf coast of Florida from Escambia County through Franklin County and from Pinellas County through Collier County (Meylan *et al.*, 1995; Brost 2003). The Florida green turtle nesting group is recognized as a regionally important colony. Green turtles have been known to nest in Georgia, but only on rare occasions (Winn, 1996). The green turtle also nests sporadically in North Carolina and South Carolina (Boettcher, 1998, 1996) and unconfirmed nests are reported in Alabama (Dailey, 1998).

Green turtles apparently have a strong nesting site fidelity and often make long distance migrations between feeding grounds and nesting beaches. Hatchlings have been observed to seek refuge and food in *Sargassum* rafts.

Leatherback Sea Turtle

Nesting grounds are distributed worldwide, with the Pacific coast of Mexico supporting the world's largest known concentration of nesting leatherbacks. The largest nesting colony in the wider Caribbean region is found in French Guiana, but nesting occurs frequently, although in lesser numbers, from Costa Rica to Columbia and in Guyana, Surinam, and Trinidad (NMFS and Service, 1992; National Research Council, 1990a).

Recent annual estimates of global nesting populations indicate 26,000 to 43,000 nesting females (Spotila *et al.*, 1996). The current largest nesting populations occur in the western Atlantic in French Guiana (4,500 to 7,500 females nesting/year), Colombia (estimated several thousand nests annually), in the western Pacific in West Papua (formerly Irian Jaya), and Indonesia (about 600 to 650 females nesting/year).

In the U.S., small nesting populations occur on the Florida east coast (35 females/year), Sandy Point, U.S. Virgin Islands (50 to 100 females/year), and Puerto Rico (30 to 90 females/year). Leatherback turtles have been known to nest in Georgia, South Carolina, and North Carolina, but only on rare occasions (Murphy,1996; Winn, 1996; Boettcher, 1998). Leatherback nesting also has been reported on the northwest coast of Florida (LeBuff, 1976; Longieliere *et al.*, 1997; Brost, 2003); a false crawl (non-nesting emergence) has been observed on Sanibel Island in southwest Florida (LeBuff, 1990).

Kemp's Ridley Sea Turtle

The Kemp's ridley has the smallest population of the endangered sea turtles. Its numbers rapidly declined since 1947, when over 40,000 nesting females were estimated in a single *arribada*. The nesting population produced a low of 702 nests in 1985 before it began to increase. In 1999 nesting season, more than 3,600 nests were deposited on Mexico nesting beaches. In 2002, 6,436 nests were documented in Mexico and an additional 40 nests were documented in the U.S. (38 in Texas and two in Florida) (MacPherson, 2002).

Status and distribution

Loggerhead Sea Turtle

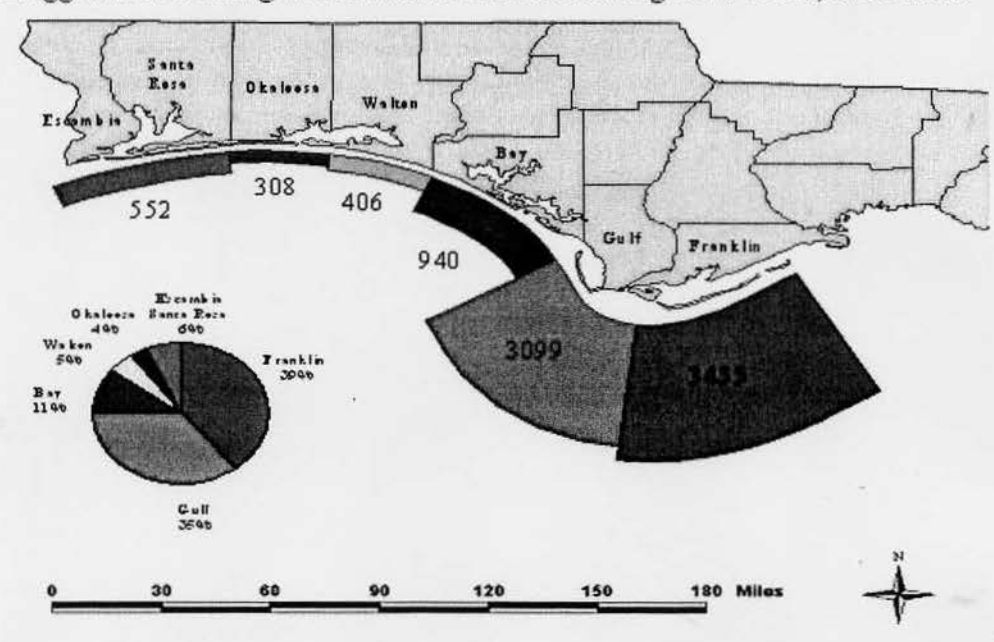
Genetic research (mtDNA) has identified four loggerhead nesting subpopulations in the western North Atlantic: (1) the Northern Subpopulation occurring from North Carolina south to around Cape Canaveral, Florida (about 29° N.); (2) South Florida Subpopulation occurring from about 29° N. on Florida's east coast to Sarasota on Florida's west coast; (3) Northwest Florida Subpopulation occurring at Eglin Air Force Base and the beaches near Panama City; and (4) Yucatán Subpopulation occurring on the eastern Yucatán Peninsula, Mexico (Bowen *et al.*, 1993; Encalada *et al.*, 1998). These data indicate that gene flow between these four regions is very low. If nesting females are extirpated from one of these regions, regional dispersal would not be sufficient to replenish the depleted nesting subpopulation.
The Northern Subpopulation has declined substantially since the early 1970's, but most of that

decline occurred prior to 1979. No significant trend has been detected in recent years (Turtle Expert Working Group, 1998, 2000). Adult loggerheads of the South Florida Subpopulation have shown significant increases over the last 25 years, indicating that the population is recovering, although a trend could not be detected from the State of Florida's Index Nesting Beach Survey program from 1989 to 1998. Nesting surveys in the Northwest Florida and Yucatán Subpopulations have been too irregular to date to allow for a meaningful trend analysis (Turtle Expert Working Group, 1998, 2000).

Loggerheads are the most common nesting sea turtle and account for over 99 percent of the sea turtle nests in northwest Florida. The eastern portion of the region has the majority of loggerhead nesting (Figure 1). The loggerhead sea turtle nesting and hatching season for the region generally extends from about May 1 through October 31. The earliest nest documented was on April 29 (St. Joseph Peninsula State Park) and the latest nest was on November 1 (Cape San Blas) (Brost, 2003). Nest incubation ranges from about 49 to 95 days.

Figure 1:

Loggerhead nesting in northwest Florida during 1993-2001, 8760 nests



Threats to loggerhead sea turtles include incidental take from channel dredging and commercial trawling, longline, and gill net fisheries; loss or degradation of nesting habitat from coastal development and beach armoring; disorientation (attraction of hatchlings away from the water) by beachfront lighting; excessive nest predation by native and non-native predators; degradation of foraging habitat; marine pollution and debris; watercraft strikes; and disease. There is specific

concern about the large amount of incidental take of juvenile loggerheads in the eastern Atlantic by longline fishing vessels from several countries.

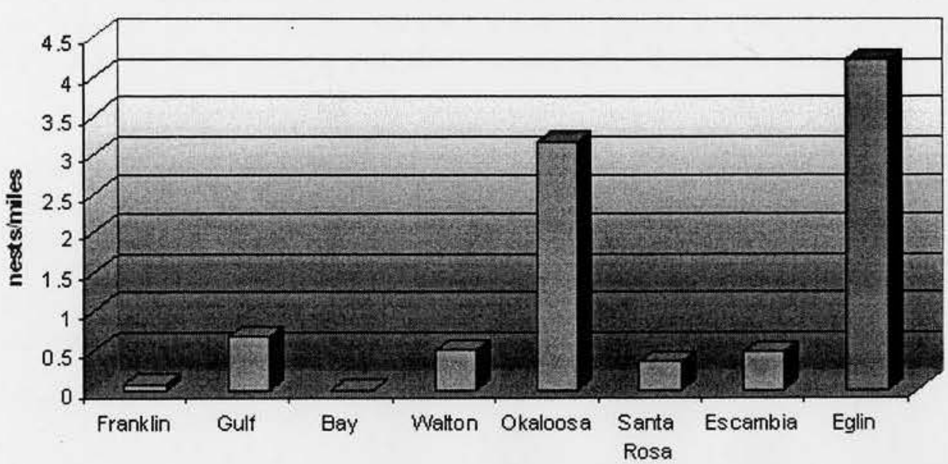
In the southeastern U.S., major nest protection efforts and beach habitat protection are underway for most of the primary nesting areas, and progress has been made in reducing mortality from commercial fisheries in U.S. waters with the enforcement of TED regulations. Many coastal counties and communities in Florida, Georgia, and South Carolina have developed beachfront lighting ordinances to reduce hatchling disorientations. Important U.S. nesting beaches have been and continue to be acquired for long-term protection. The migratory nature of loggerheads severely compromises these efforts once they move outside U.S. waters, however, since legal and illegal fisheries activities in some countries are causing high mortality on loggerhead sea turtle nesting populations of the western north Atlantic region. Due to the long range migratory movements of sea turtles between nesting beaches and foraging areas, long-term international cooperation is essential for recovery and stability of nesting populations.

Green Sea Turtle

Total population estimates for the green turtle are unavailable, and trends based on nesting data are difficult to assess because of large annual fluctuations in numbers of nesting females. For instance, in Florida, where the majority of green turtle nesting in the southeastern U.S. occurs, estimates range from 200 to 1,100 females nesting annually. Populations in Surinam, and Tortuguero, Costa Rica, may be stable, but there is insufficient data for other areas to confirm a trend.

Green sea turtle nesting has been documented in all counties (but not on all beaches) in northwest Florida (Figure 2). The green sea turtle nesting and hatching season for this region extends from May 1 through October 31, the earliest nest was documented on May 20 (Santa Rosa Island) and the latest nest was documented on August 21 (Gulf Islands National Seashore). Nest incubation ranges from about 60 to 90 days. Nesting in northwest Florida has been consistently documented at least every other year since 1990 (Brost, 2003).

Figure 2: Average density of green sea turtle nesting in NW Florida, 1994, 1996, 1998, 2000, & 2002



A major factor contributing to the green sea turtle's decline worldwide is commercial harvest for eggs and food. Fibropapillomatosis, a disease of sea turtles characterized by the development of multiple tumors on the skin and internal organs, is also a mortality factor and has seriously impacted green turtle populations in Florida, Hawaii, and other parts of the world. The tumors interfere with swimming, eating, breathing, vision, and reproduction. Turtles with heavy tumor burdens may die. Documented cases of fibropapillomatosis in northwest Florida are increasing (Redlow 2003). Other threats include loss or degradation of nesting habitat from coastal development and beach armoring; disorientation of hatchlings by beachfront lighting; excessive nest predation by native and non-native predators; degradation of foraging habitat; marine pollution and debris; watercraft strikes; and incidental take from channel dredging and commercial fishing operations.

In the southeastern U.S., major nest protection efforts and beach habitat protection are underway at most of the larger nesting areas, and significant progress has been made in reducing mortality from commercial fisheries in U.S. waters with the enforcement of TED regulations. Many coastal counties and communities in Florida have developed beachfront lighting ordinances to reduce hatchling disorientations. Important U.S. nesting beaches have been and continue to be acquired for long-term protection. The Service and NOAA-Fisheries have been funding research on the fibropapilloma disease for several years to expand knowledge of the disease with the goal of developing an approach for remedying the problem. Due to the long range migratory movements of sea turtles between nesting beaches and foraging areas, long-term international cooperation is essential for recovery and stability of nesting populations.

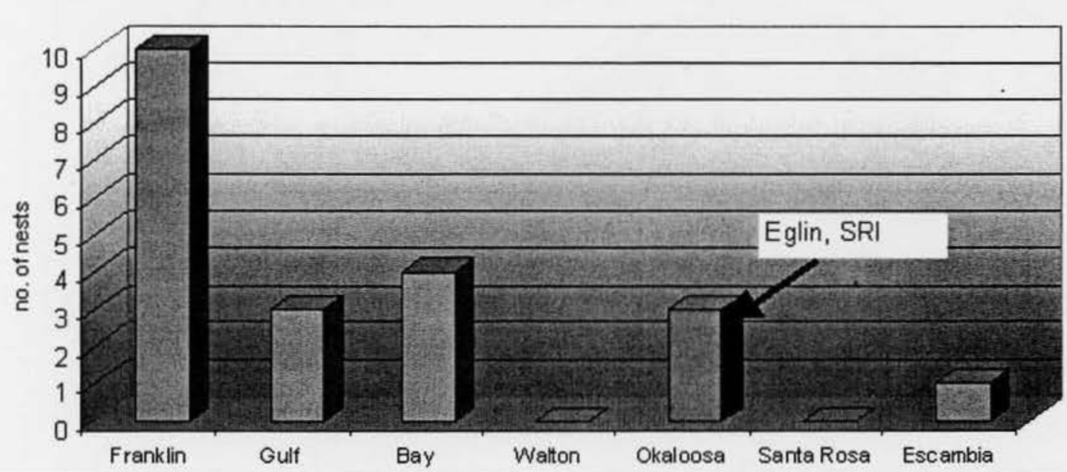
Leatherback Sea Turtle

Declines in leatherback nesting have occurred over the last two decades along the Pacific coasts of Mexico and Costa Rica. The Mexican leatherback nesting population, once considered to be the world's largest leatherback nesting population (65 percent of worldwide population), is now less than one percent of its estimated size in 1980. Spotila *et al.* (1996) recently estimated the number of leatherback sea turtles nesting on 28 beaches throughout the world from the literature and from communications with investigators studying those beaches. The estimated worldwide population of leatherbacks in 1995 was about 34,500 females on these beaches with a lower limit of about 26,200 and an upper limit of about 42,900. This is less than one third the 1980 estimate of 115,000. Leatherbacks are rare in the Indian Ocean and in very low numbers in the western Pacific Ocean. The largest population is in the western Atlantic. Using an age-based demographic model, Spotila *et al.* (1996) determined that leatherback populations in the Indian Ocean and western Pacific Ocean cannot withstand even moderate levels of adult mortality and that even the Atlantic populations are being exploited at a rate that cannot be sustained. They concluded that leatherbacks are on the road to extinction and further population declines can be expected unless action is taken to reduce adult mortality and increase survival of eggs and hatchlings.

Documented leatherback nests are rare in northwest Florida. From 1993 to 2002, a total of 26 nests have been reported on northwest Florida beaches: fifteen in Franklin County, four in Bay County, three in Okaloosa County, three in Gulf County, and one in Escambia County (Brost, 2003)

(Figure 3). The first recorded leatherback nest in the region was in 1974, on St. Vincent Island, Franklin County. The majority of the nests have had low natural hatching success. The greatest number of successful nests in any one season occurred in 2000, when three leatherback nest were documented to produce hatchlings that successfully emerged from the nest. One nest was on the Ft. Pickens Unit of Gulf Islands National Seashore, Escambia County and two of the nests were on Eglin Air Force Base, Santa Rosa Island, Okaloosa County. The leatherback sea turtle nesting and hatching season for this region extends from late April through October 31. For confirmed nesting, the earliest nest was documented on April 25 (St. George Island) and the latest nest documented on June 19 (Eglin). Documented nest incubation in northwest Florida ranges from about 63 to 84 days (Brost, 2003; Miller, 2001b; Nicholas, 2001).

Figure 3: Total number of leatherback nests in NW Florida, 1993-2002



The decline of the Pacific leatherback population is believed primarily to be the result of exploitation by humans for the eggs and meat, as well as incidental take in numerous commercial fisheries of the Pacific. Other factors threatening leatherbacks globally include loss or degradation of nesting habitat from coastal development; disorientation of hatchlings by beachfront lighting; excessive nest predation by native and non-native predators; degradation of foraging habitat; marine pollution and debris; and watercraft strikes.

It is crucial to maximize hatchling production for the remaining leatherback nesting that occurs along the extensive Pacific coasts of Mexico, Costa Rica, and other Central American countries. Due to the long range migratory movements of sea turtles between nesting beaches and foraging areas, long-term international cooperation is essential for recovery and stability of nesting populations. From 1998 to 1999, the Service provided annual funding to assist recovery efforts for the leatherback in Mexico and Costa Rica, including support for nesting surveys and nest protection. In the southeastern U.S. and U.S. Caribbean, major nest protection efforts and beach habitat protection are underway for most of the important nesting areas. In addition, research is underway

to develop technologies to minimize leatherback mortality associated with the longline fishery. Many coastal counties and communities have developed beachfront lighting ordinances to reduce hatchling disorientations. Important U.S. nesting beaches have been and continue to be acquired for long-term protection.

Kemp's Ridley Sea Turtle

Kemp's ridley sea turtles are assumed to constitute a single stock (Pritchard, 1989; Marquez, 1994 as cited in Turtle Expert Working Group, 1997, 1998). The scarcity of Kemp's ridleys about 20 years ago prompted efforts to establish a protected nesting colony in the United States. From 1978 to 1988, an international project began to increase the Kemp's ridley nesting on Padre Island National Seashore. Eggs were airlifted from Rancho Nuevo, Mexico and transported to Texas; hatched in controlled conditions, and released along the Texas shore of the Gulf of Mexico. Scientists hoped that turtles would eventually return to nest and establish a colony at Padre Island National Seashore where protection was available. Now, 10 to 15 year old mature Kemp's ridley females are returning to the south Texas coast. Many, identified by their marking from the original hatching program, have been found nesting on Padre Island National Seashore. The first known female to return and nest was in 1996, hatched at Padre Island National Seashore in 1983. Since 1996, nine marked females nested on north Padre Island and nearby Mustang Island (U.S. Geological Survey, 2002). Eleven ridley nests have now been documented in Florida in Volusia, Lee, Sarasota, Pinellas, and Escambia counties (Brost, 2003; Nicholas, 2001). Hatchlings, after leaving the nesting beach, are believed to become entrained in eddies within the Gulf of Mexico, where they are dispersed within the Gulf and Atlantic by oceanic surface currents until they reach about eight inches long, when they enter coastal shallow water habitats.

The decline of this species is primarily due to human activities, including the direct harvest of adults and eggs and incidental capture in commercial fishing operations. Under today's protection, the population appears to be in the early stages of recovery.

The recent nesting increase can be attributed to protection of females and their nests in Mexico, and the requirement to use TEDs in shrimp trawls both in the U.S. and Mexico. In 1966, conservation efforts for the Kemp's ridley were initiated on the beach near Rancho Nuevo in Tamaulipas, Mexico. This locale is the only place in the world where large nesting groups of this species were and are still known to occur. From 1966 to 1987, conservation efforts focused on the area of Rancho Nuevo with one turtle protection camp. In 1978, the U.S. joined with Mexico at Rancho Nuevo in a bi-national effort to prevent the extinction of the Kemp's ridley. In 1988, this bi-national program expanded to the south and another camp was added. In 1989, a third camp was established when the program was expanded to the north of Rancho Nuevo. By 1997, a total of seven camps had been established along the Tamaulipas and Veracruz coasts to allow for increased nest protection efforts.

The Mexico government also prohibits harvesting and is working to increase the population through more intensive law enforcement, by fencing nest areas to diminish natural predation, and by relocating all nests into hatcheries to prevent poaching and predation. Relocation of nests into

hatcheries is currently a necessary management measure. However, this concentration makes the eggs more susceptible to reduced viability due to movement-induced mortality; disease vectors, catastrophic events like hurricanes and predators.

Common threats to all sea turtles in Northwest Florida

Coastal development

Loss of nesting habitat related to development of the coastline has had the greatest impact on nesting sea turtles in this region. Beachfront development not only causes the loss of suitable nesting habitat but can result in the disruption of powerful coastal processes accelerating erosion and interrupting the natural shoreline migration (National Research Council, 1990b). This may in turn cause the need to protect upland structures and infrastructure by armoring, groin placement, beach berm construction, and beach nourishment which cause changes in, additional loss or impact to the remaining sea turtle habitat.

Hurricanes

A predominant threat to sea turtle nesting is tropical storms and hurricanes. In general, hurricanes result in severe erosion of the beach and dune systems. Overwash and blowouts are common on barrier islands. Hurricanes and other storms can result in the direct or indirect loss of sea turtle nests, either by erosion or washing away of the nests by wave action or inundation or "drowning" of the eggs or hatchlings developing within the nest or indirectly by loss of nesting habitat. Depending on their frequency, storms can affect sea turtles on either a short-term basis (nests lost for one season and/or temporary loss of nesting habitat) or long term, if frequent (habitat unable to recover). How hurricanes affect sea turtle nesting also depends on its characteristics (winds, storm surge, rainfall), the time of year (within or outside of the nesting season), and where northeast edge of the hurricane crosses land.

Because of the limited remaining nesting habitat, frequent or successive severe weather events could threaten the ability of certain sea turtle populations to survive and recover. Sea turtles evolved under natural coastal environmental events such as hurricanes. Hurricanes were probably responsible for maintaining coastal beach and dune nesting habitat through repeated cycles of destruction, alteration, and recovery. The extensive amount of pre-development coastal beach and dune habitat allowed sea turtles to survive even the most severe hurricane events. It is only within the last 20 to 30 years that the combination of habitat loss to beachfront development and destruction of remaining habitat by hurricanes has increased the threat to sea turtle survival and recovery. On developed beaches, typically little space remains for sandy beaches to become re-established after periodic storms. While the beach itself moves landward during such storms, reconstruction or persistence of structures at their pre-storm locations can result in a major loss of nesting habitat.

Beachfront Lighting

Beachfront lighting may cause disorientation (loss of bearings) and misorientation (incorrect orientation) of sea turtle hatchlings. Visual signs are the primary sea-finding mechanism for hatchlings (Mrosovsky and Carr, 1967; Mrosovsky and Shettleworth, 1968; Dickerson and Nelson, 1989; Witherington and Bjorndal, 1991). Artificial beachfront lighting is a documented cause of hatchling disorientation and misorientation on nesting beaches (Philbosian, 1976; Mann, 1977; Conti, 2002). The emergence from the nest and crawl to the sea is one of the most critical periods of a sea turtle's life. Hatchlings that do not make it to the sea quickly become food for ghost crabs, birds, and other predators or become dehydrated and may never reach the sea. Some types of beachfront lighting attract hatchlings away from the sea while some lights cause adult turtles to avoid stretches of brightly illuminated beach. Research has documented significant reduction in sea turtle nesting activity on beaches illuminated with artificial lights; relative to adjacent areas (Witherington, 1992). During the 2002 sea turtle nesting season in Florida, over 43,000 turtle hatchlings were disoriented. Lighting associated with condominiums had the greatest impact causing disorientation/misorientation of 35 percent. Other causes included street lights, parking lot lights, single family residences, and sky glow (Conti, 2003).

Beachfront lighting from military facilities and coastal development have caused disorientation of sea turtle hatchlings that emerge from nests on Eglin, Santa Rosa Island. Prior to Hurricanes Opal and Erin, Eglin was in the process of converting lighting on military beachfront structures to sea turtle friendly fixtures. After the hurricanes, conversion was slowed by the process of rebuilding of new structures and funding availability. The hurricanes also cause erosion of dunes that resulted in more light reaching the beach. On new military related facilities, sea turtle lighting is being included in the design and construction. Conversion of existing facilities has been completed (Miller, 2002). Disorientation from the sky glow of Destin and Ft. Walton Beach also affects hatchlings on Eglin beaches (Miller, 2002).

Predation

Depredation by a variety of predators can considerably decrease sea turtle nest hatching success. Depredation and harassment or both of nesting turtles, eggs, nests and hatchlings by native and non-native species, such as raccoon, coyote, fox, feral hog, cats, birds, and ghost crab, have been documented on the Atlantic and Gulf coasts of Florida (Daniel et al., 2002; Northwest Florida Partnership, 2000; Leland, 1997; Maxwell, 2001; NMFS and Service, 1991a). As nesting habitat dwindles, it is essential that nest production be naturally maximized so the turtles may continue to exist in the wild.

Predators of sea turtle nests and hatchlings on Eglin, Santa Rosa Island have included raccoon, coyote, red fox, ghost crabs, and ants. Documented depredation rates on Eglin increased from 10 percent of the loggerhead nests in 1993 to 67 percent of the loggerhead nests in 1997. An intensive integrated predator control approach was implemented on the island during the 1998 nesting season (Miller, 2001a). Reduction in predation rates improved slightly in 1998 (54 percent) and by 2001, the rate was reduced to zero percent.

Eglin's predator control program has been part of the state/federal interagency partnership for protection of threatened and endangered species on coastal public lands in northwest Florida through predator control. The partners have contracted with the U.S. Department of Agriculture to implement the predator control plan since 1997. It has been successful throughout the region. Continued low predation rates of sea turtle nests throughout northwest Florida have been documented. The integrated predator approach begins with protection of the sea turtle nests as soon as they are laid. As nests are located the morning after they are deposited, a flat screen is placed on top of each nest. As needed, direct control of problem predators is also accomplished.

Driving on the Beach

The operation of motor vehicles on the beach affects sea turtle nesting by interrupting a female turtle approaching the beach; headlights disorienting or misorienting emergent hatchlings; vehicles running over hatchlings attempting to reach the ocean; and vehicle tracks traversing the beach interfere with hatchlings reaching the ocean. Apparently, hatchlings become diverted not because they cannot physically climb out of the rut (Hughes and Caine, 1994), but because the sides of the track cast a shadow and the hatchlings lose their line of sight to the ocean horizon (Mann, 1977). The extended period of travel required to negotiate tire tracks and ruts may increase the susceptibility of hatchlings to dehydration and depredation during migration to the ocean (Hosier *et al.,* 1981). Driving directly above or over incubating egg clutches or on the beach can cause sand compaction which may result in adverse impacts on nest site selection, digging behavior, clutch viability, and emergence by hatchlings decrease nest success and directly kill pre-emergent hatchlings (Mann, 1977; Nelson and Dickerson, 1987; Nelson, 1988). Vehicle traffic on narrow beaches where driving is concentrated on the high beach and foredune may contribute to beach erosion.

Driving on the beach at Eglin is only allowed for military missions including the protection, conservation, management and research of natural resources. In 1999, Eglin and the Service underwent formal consultation regarding the Theater Missile Defense Program on Cape San Blas and Okaloosa/Santa Rosa Island and in 2001 on Eglin's Natural Resources Integrated Management Plan (INRMP). Final conclusions of both consultations included a protocol for driving on the beach during sea turtle nesting season.

Sea Turtles Nesting

Sea Turtle Nest Monitoring on Eglin, Santa Rosa Island

The INRMP provides guidelines/regulations to address conservation and management of sea turtles on Santa Rosa Island. Eglin initiated conservation and management of sea turtles on base controlled lands in 1987. The monitoring is conducted under State of Florida permit no. 076 (Brost, 2003). Surveys are conducted seven days a week from May 15 to October 31. Eglin participates in the State's index nesting beach survey program (INBS). The beachfront is divided into one-half mile segments for reporting purposes. Surveys begin at sunrise. Approximately 17 miles of Santa Rosa

Island are surveyed by using all terrain vehicles (ATVs). Approximately 4 miles of the beach are open to the public and 13 miles are restricted access. Turtle crawls are identified as a true nesting crawl or false crawl. Nests are marked with stakes and surrounded with surveyor flagging tape, and if needed screened to prevent predation. The marked nests are monitored throughout the incubation period for storm damage, predation, hatching activity and hatch and emergence success. Nests are relocated within the first 12 hours of being deposited, or before 9 a.m. the morning following deposition, if threatened by erosion or inundation.

Analysis of the species/critical habitat likely to be affected

Santa Rosa Island is a barrier island and part of a complex and dynamic coastal system that is continually responding to inlets, tides, waves, erosion and deposition, longshore sediment transport, and depletion, and fluctuations in sea level. The location and shape of barrier islands beaches perpetually adjusts to these physical forces. Winds move sediment across the dry beach forming dunes and the island interior. The natural communities contain plants and animals that are subject to shoreline erosion and deposition, salt spray, wind, drought conditions, and sandy soils. Vegetative communities include foredunes, primary and secondary dunes, interdunal swales, sand pine scrub, and maritime forests. During storm events, overwash is common and may breach the island at dune gaps or other weak spots, depositing sediments on the interior and backsides of islands, increasing island elevation and accreting the soundside shoreline. Breaches may result in new inlets through the island.

Since the ARG/MEU Training may take place twice a year each year during the sea turtle nesting season (May 1 through November 30), the training activities have the potential to affect nesting and hatchling sea turtles. In particular, sea turtle nests in northwest Florida begin to hatch in July, thus there is a potential to impact hundreds of hatchling sea turtles. The Marine Corps and Eglin have proposed a variety of conservation measures to be incorporated into the training activities. The measures would reduce some of the potential impacts. The effect of the ARG/MEU Taining activities with incorporation of the proposed conservation measures on each of the sea turtle species' overall survival and recovery would be considered in this biological opinion.

Effects include the physical presence of troops, vehicles, and watercraft, on the beach during nighttime hours when nesting and hatchling emergence from nests predominately occur, causing female turtles to false crawl or abort the nesting process or be injured, entrapped and hatchling turtles to be entrapped as they emerge from the nest and crawl to the Gulf of Mexico. Indirectly, the project could affect the behavior of adult female sea turtles approaching the beach and selecting a suitable site to nest or hatchling sea turtles emerging from the nest and crawling to the Gulf of Mexico becoming misoriented or disoriented from noise, human presence, light, moving watercraft or vehicles, erosion of the beach and dunes from troop movement. Erosion of the beach and dune system affects the quality of nesting habitat.

Flatwoods Salamander

Species/critical habitat description

The flatwoods salamander (*Ambystoma cingulatum*) is listed as a threatened species under the authority of the Endangered Species Act of 1973, as amended (Act). The flatwoods salamander was designated as threatened in the Federal Register, April 1, 1999 (64 FR 15691), and became effective on May 3, 1999. No critical habitat has been designated for this species.

The flatwoods salamander is a slender, small-headed mole salamander that is seldom greater than 5 inches in length. Adult dorsal color ranges from black to chocolate-black with highly variable, fine, light gray lines forming a net-like or cross-banded pattern across the back. Undersurface is plain gray to black with a few creamy or pearl gray blotches or spots. Flatwoods salamander larvae are long and slender, broad-headed and bushy-gilled, with white bellies and striped sides (Ashton, 1992; Palis, 1995a). Flatwoods salamanders are known to occur in isolated populations across the lower southeastern Coastal Plain, with the majority of the remaining known populations located in Florida.

Optimum adult habitat for the flatwoods salamander is an open, mesic (moderate moisture) woodland of longleaf/slash pine (*Pinus palustris/P. elliottii*) flatwoods maintained by frequent fires, with a dominant ground cover of wiregrass (*Aristida spp.*). The ground cover supports a rich herbivorous invertebrate community that serves as a food source for the species (64 FR 15692).

Since they may disperse long distances from their breeding ponds to upland sites, desiccation can be a limiting factor. Thus, it is important that areas connecting their wetland and terrestrial habitats are conserved in order to provide cover and appropriate moisture regimes during their migration. High quality habitat for the flatwoods salamander includes a number of isolated wetland breeding sites within a fire maintained landscape of longleaf pine/slash pine flatwoods having an abundant herbaceous ground cover (Sekerak, 1994). In Florida, Palis (1997) found that 70 percent of the active breeding sites were surrounded by second-growth longleaf or slash pine flatwoods with nearly undisturbed wiregrass ground cover.

Since temporary ponds are not likely permanent fixtures of the landscape due to succession, there would be inevitable extinctions of local populations (Semlitsch, 1998). By maintaining a mosaic of ponds with varying hydrologies, and by providing terrestrial habitats for adult life stages and colonization corridors, some prevention of local population extinction can be achieved. A mosaic of ponds would ensure that appropriate breeding conditions would be achieved under different climatic regimes. Colonization corridors would allow movement of salamanders to new breeding sites or previously occupied ones (Semlitsch, 1998).

Life history

Adult and subadult flatwoods salamanders live in underground burrows. Adult flatwoods salamanders move above ground to their wetland breeding sites during rainy weather, in association with cold fronts, from October to December (Palis, 1997). Typical breeding sites are isolated pond cypress *(Taxodium ascendens*), blackgum (*Nyssa sylvatica* var. *biflora*), or slash pine (*Pinus elliottii*) dominated depressions which dry completely on a cyclic basis. They are generally shallow and relatively small, and have a marsh-like appearance with sedges often growing throughout and wiregrass (*Aristida* sp.), panic grasses (*Panicum* spp.), and other herbaceous species concentrated in the shallow water edges.

After breeding, adult flatwoods salamanders leave the pond. In a study by Ashton (1992), flatwoods salamanders were found greater than 1,859 yards from their breeding pond. Thus, a flatwoods salamander population has been defined as those salamanders using breeding sites within 2 miles of each other, barring an impassable barrier such as a perennial stream (Palis, 1997). However, based on more recent data (Semlitsch, 1998) and additional peer review, the final listing rule recommends a 1,476-feet "buffer" around breeding ponds. to protect the majority of a flatwoods salamander population from the adverse effect of certain, specified, silvicultural practices. This buffer extends 1,476 feet out from the wetland edge.

Population dynamics

Historical records for the flatwoods salamander are limited. Longleaf pine/slash pine flatwoods historically occurred in a broad band across the lower southeastern Coastal Plain. The flatwoods salamander likely occurred in appropriate habitat throughout this area (64 FR 15691). Range-wide surveys in Alabama, Florida, Georgia, and South Carolina have been ongoing since 1990 in an effort to locate new populations. Most surveys were searches for the presence of larvae in the grassy edges of ponds.

The combined data from the surveys completed since 1990 indicate that 53 populations of flatwoods salamanders are known from across the historical range. Most of these occur in Florida (38 populations or 72 percent). Eleven populations have been found in Georgia, four in South Carolina, and none have been found in Alabama. Some of these populations are inferred from the capture of a single individual. Slightly more than half the known populations for the flatwoods salamander occur on public land (33 of 55, or 62 percent).

Over the past 8 years, at least 530 wetlands with a minimum of marginal suitability for the flatwoods salamander (i.e., intact pine flatwoods habitat) were surveyed in 23 counties in Florida. Of this total, 81 new breeding sites were found, representing 15 percent of the total number of suitable sites sampled. Sixty-nine percent of these new breeding sites occur in Liberty and Okaloosa counties within the Apalachicola National Forest and Eglin Air Force Base (64 FR 15693).

Fire is needed to maintain the natural pine flatwoods community. The disruption of the natural fire cycle has led to an increase of slash pine on areas previously dominated by longleaf pine, increases in hardwood understory and canopy, and subsequent decreases in herbaceous ground cover (64 FR 15701). Isolated ponds that are surrounded with pine plantations and are protected from fire may become unsuitable breeding sites for the flatwoods salamander. This is a result of canopy closure and the concomitant reduction in herbaceous vegetation necessary for egg deposition and larval development (Palis, 1993).

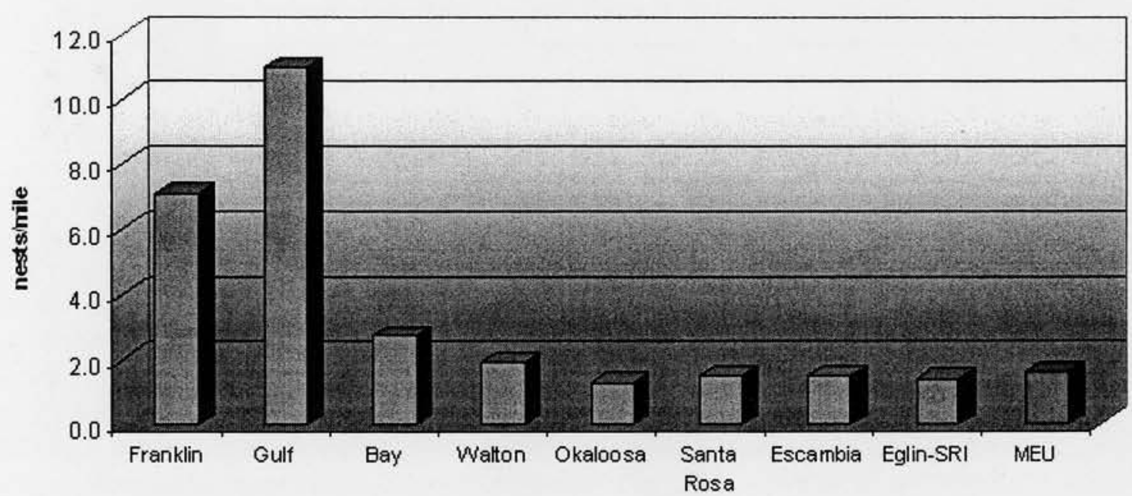
ENVIRONMENTAL BASELINE

Sea Turtles

Status of the Species Within the Action Area

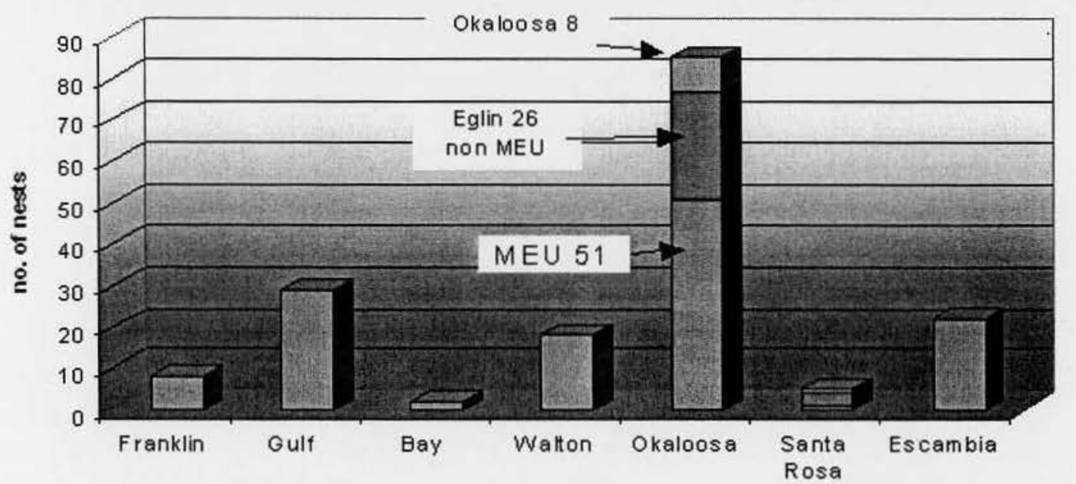
Loggerhead nesting on Santa Rosa Island is considered low density compared to other northwest Florida beaches (Figure 4). Average annual nesting density from 1993 to 2002 was 1.4 nests per mile. During that time, 265 loggerhead nests and 227 false crawls were documented. The nests had a mean hatching success rate of 45 percent (range 0 to 91 percent). Of those 265 nests, 46 were relocated to higher beach elevations within the same vicinity of the original nest location. The relocated nests had a mean hatching success rate of 34 percent (range 0 to 74 percent). Loggerhead nests have been fairly evenly distributed along the 17 miles of Gulf beachfront on Santa Rosa Island within Eglin lands. However, within the INBS one-half mile zones, nesting densities are noted to have a slightly higher density of 1.56 nests per mile (Figure 4).

Figure 4: Average annual nesting density of loggerhead sea turtles in NW Florida 1993-2002



Eglin Santa Rosa Island supports the highest numbers of green sea turtle nests in northwest Florida (Figure 5). Green turtle nesting has been documented on Santa Rosa Island every other year since 1990. There were a total of 80 green turtle nests during the 1994, 1996, 1998, 2000, 2002 seasons. The majority of the nests have been located between Sites A-7 and A-13A.

Figure 5: Total number of green sea turtle nests in NW Florida, 1993-2002



Leatherback nesting was documented on Eglin, Santa Rosa Island for the first time in 2000. Three nests that were thought to be leatherback nests were located, two of the nests hatched, and one was confirmed by identification of hatchlings (Miller, 2001b). All three nests were found on the restricted portion of the island adjacent to but not within the ARG/MEU Training area.

No Kemp's ridley sea turtle nests have been documented on Eglin beaches on Santa Rosa Island. In 1998 a ridley nest was documented on Gulf Islands National Seashore, Escambia County, Florida and another was documented on Bon Secour National Wildlife Refuge in Alabama (Nicholas, 2001; MacPherson, 2002). In 2001, a second record of a Kemp's ridley nest was documented on the Bon Secour National Wildlife Refuge (South 2001).

Factors Affecting Species Environment Within the Action Aarea

Sea Turtle Stranding on Eglin lands on Santa Rosa Island

Eglin participates in the State of Florida Sea Turtle Stranding and Salvage Network (STSSN) and completes and submits STSSN reports as appropriate. From 1989 to 2002, 57 sea turtles were documented to strand on Eglin beaches or Gulf front lands. Average annual strandings are

approximately 4 per year (range 1 to 9). The species that were stranded included: loggerhead (29), leatherback (10), ridley (6), green (6), and unidentified (2). Nine of the strandings were found on the public beaches of Eglin nearest site A-1. The majority of the strandings were located on the restricted-access portions of the island near site A-10. Nine strandings were on the shoreline of Choctawhatchee Bay within the boundaries of Eglin (Miller, 2003). Strandings in northwest Florida have increased 83 percent from the previous ten-year average in the 1990s (Redlow, 2003).

Artificial Beachfront Lighting

Beachfront lighting management has been implemented for military controlled facilities on Santa Rosa Island, and nests are no longer relocated because of the potential for lighting disorientations. By far, the sky glow from Ft. Walton Beach north of Santa Rosa Sound causes the greatest number of disorientations. Other noted causes include lighting from beachfront development (condominiums, restaurant, and hotels), Base housing across the Sound on Hurlburt Field, and lights at Sites A-4, A-10, and A-11 (FWC/ Florida Marine Research Institute Marine Turtle Hatchling Disorientation Incident Report Forms, 1993 to 2000).

Flatwoods Salamander

Status of the Species Within the Action area

Data on the species in the action area is summarized in the report *Distribution and Breeding Biology of the Flatwoods Salamander (Ambystoma cingulatum) and Gopher Frog (Rana capito) on Eglin Air Force Base, Florida* (1995b). This study documented twenty-one known breeding sites in the surrounding area known as the East Bay flatwoods. The report also identified potential threats to salamander habitat including bedding, roller chopping, firebreaks, fire suppression, herbicides, and stand density. However, on-going management activities are expected to improve both adult and breeding habitat in both occupied and unoccupied habitat.

Factors Affecting Species Environment Within the Action Area

This section addresses all unrelated Federal, State, local, Tribal, and private actions within the action area that would occur contemporaneously with the proposed action and would affect the environment of the flatwoods salamander.

Eglin AFB has an on-going natural resource management program. This program should benefit flatwoods salamanders. Also, as a result of wildfires in the urban interface, Eglin AFB has identified projects that would be conducted to reduce the threat of fire to neighboring landowners and benefit flatwoods salamander habitat at the same time. All projects reviewed by the Service up to this date have been determined to have only temporary effects to the species.

EFFECTS OF THE ACTION

Sea Turtles

Certain aspects of the ARG/MEU Readinesss Training will take place on Santa Rosa Island. The training events could take place during sea turtle nesting season, which in northwest Florida is considered to occur between May 1 and November 30. However, based on 13 years of data analyzed by Eglin, sea turtle nesting and hatching season on Santa Rosa Island occurs between mid-May and mid-November. Sea turtles are nocturnal nestors and hatchling emergence from the nest is usually during the night. Direct impacts to nesting or hatchling sea turtles could occur from the physical presence of troops, watercraft, vehicles, or other equipment on the beach at night. Indirect impacts could include changes in the nesting behavior of nesting female sea turtles, reduced nest hatch success and hatchling emergence, and temporary or long term alterations to the island's beach and dune topography. Conservation Measures have been incorporated into the ARG/MEU training activities to avoid or minimize the potential impacts. Incorporation of these measures has resulted in Eglin AFB determining that 10 of the 17 ARG/MEU Training events would not likely adversely affect nesting and hatchling sea turtles. Thus, the Service concurs with the findings of the biological assessment summarized in Table D-11 on page D-34 of that document.

However, even with the incorporation of Conservation Measures, 7 of the trainings may adversely affect sea turtles because they occur during the night or because the action may negatively affect their nesting habitat. The training activities include Insertion of R&S Teams (R&S), Mechanized Raid Wet (MRW), Mechanized Raid Dry (MRD), Marine Expeditionary Unit Landing (MEU landing), Direct Action (DA), Withdrawal (W), and TECG/OPFOR. Each training event could last for 10 days during any time of the year. The training would be situated on the beach and dune habitats of the island where sea turtles nest or traverse to and from nests. Eglin has documented sea turtle nesting on the island since 1989. Thus, effects to nesting and hatchling sea turtles could occur as a result of the ARG/MEU training being located on the beach and dunes of Santa Rosa Island, being scheduled during sea turtle nesting season, and being conducted at night. ARG/MEU training is proposed to be an ongoing activity at Eglin. There are basic training activities that are conducted for each of the 7 types of training (Table 1).

Table 1: ARG/MEU Training activities that could affect nesting sea turtles, Santa Rosa Island, Eglin

Mission Activity	Amphibious Landing				Ground Movement			Aviation Operations		Munitions Use		Pyrotechnics		
	LCAC	LCU	AAV	zodiac	Troops	Tracked Vehicle	Wheeled Vehicle	Helos	Planes	Blanks	Small Arms	Flares	Smoke	Simulators
R&S	✓			✓	✓			✓				✓	✓	✓
MRW	✓	✓	✓		✓	✓	✓	✓	✓	✓		✓	✓	✓
MRD					✓	✓	✓	✓	✓	✓		✓	✓	✓
MEU Land	✓	✓	✓		✓	✓	✓	✓	✓	✓			✓	✓
DA				✓	✓			✓			✓	✓	✓	✓
W	✓	✓	✓		✓	✓	✓	✓	✓					
TECG/ OPFOR							✓							✓

Proximity of Action: The ARG/MEU Training would occur directly in and adjacent to nesting habitat for sea turtles and dune habitats that ensure the stability and integrity of the barrier island. Specifically, the training would potentially impact nesting loggerhead, green, and leatherback sea turtles.

Distribution: The ARG/MEU Training activities that may impact nesting and hatchling sea turtles would occur in the 7.0 mile beachfront from INBS zones 1 to 9 and 14 to 19, approximately between sites A-10 and A-15, Santa Rosa Island on Eglin.

Timing: The timing of the ARG/MEU Training could directly impact nesting and hatchling sea turtles if conducted between May 1 and November 30.

Nature of the Effect: The effects of the ARG/MEU Training activities may destroy, alter, or diminish the nesting success, hatching success, and hatchling emergence of sea turtles. Any decrease in productivity and or survival rates would contribute to a vulnerability and endangerment of loggerhead sea turtles or the extinction of green and leatherback sea turtles.

Duration: The ARG/MEU Training may have a long-term presence on Santa Rosa Island. This could result in a constant pressure on the nesting populations of the sea turtles on the island. The training may occur up to twice a year for 10 days, within or outside of the nesting season.

Disturbance frequency: The northwest Florida subpopulation of loggerhead sea turtles could experience decreased nesting success, hatching success and hatchling emergence with repeated disturbance, resulting from the ARG/MEU Training being conducted during the nesting season.

Green nesting could similarly experience decreased nesting and hatching success and hatchling emergence that could significantly effect the overall number of green turtle nesting in the northwest Florida panhandle.

Disturbance intensity and severity: Depending on the timing of the ARG/MEU Training events during sea turtle nesting season, effects to the loggerhead and green sea turtle populations of the northwest Florida and potentially the U.S. populations could be important. Especially for loggerhead sea turtles, extirpation of the northwest Florida subpopulation would probably not be replenished by regional dispersal from other nesting subpopulations. The significance of the green sea turtle nesting at Santa Rosa Island to the conservation of the U.S. population of green sea turtles is unknown.

Analysis for Effects of the Action

Direct effects

The period of greatest impacts to nesting sea turtles from the ARG/MEU Training would be during peak nesting in June and July. On an average annual basis, 11 nests could be laid within the 7-mile training area. Of those nests, 89 percent (10 nests) of the nests would laid during the peak nesting period. During a 10-day training event, it is estimated that two loggerhead sea turtle nests could be impacted by either the training activities (Table 2).

For green sea turtles, on an average annual basis 7. 4 nests are estimated to be laid in the 7-mile training area. Of those nests, 85 percent (6.3 nests) would be laid in during the peak nesting period in June and July. of the nesting occurs it is estimated that one nest could be impacted by either the training activities during a 10-day event (Table 2). The impact to green turtles would be expected to occur every other year; if the current nesting trend continues, nesting would occur during even number years (2004, 2006, 2008, etc.).

Because of the rarity of nesting activity and paucity of data on leatherback and Kemp's ridley nesting in the northwest Florida, it is estimated one or less than one nest of each species a year would be potentially impacted by the training activities.

Table 2: ARG/MEU Training, 7-mile Area, Santa Rosa Island, Eglin

	Loggerhead	Green	Leatherback***	Kemp's Ridley*
Total number nests	142*	52**	0	0
Peak nesting period (60 days)	June and July	June and July	none- May-June outside training area	no data
Average annual no. of nests per mile	1.56 nests	1.06 nests	insufficient data	no data
Average annual no. of nests per year	11 nests	7.4 nests	insufficient data	no data
Average annual no. of nests during peak nesting	9.8 nests (10)	6.3 nests (biennial)	insufficient data	no data
Avg. annual no. of nests per mile each day -peak nesting	0.17 nests	0.11 nests	insufficient data	no data
Avg. annual no. of nests per 10-day training event peak	**1.7 nests ***	**1.1 nests ****	**insufficient data**	**no data**
Average annual no. of nests misidentified as false crawls (7 percent)	**0.7 nest** [xx]	**0.4 nest (< 1)** [xx]	**insufficient data**	**no data**
Female turtles that false crawl per 10-day event - during peak	**1.7 females** [xx]	**1.0 females** [xx]	**insufficient data**	**no data**
Avg. annual female turtles on the beach per 10-day event - during peak	**0.2 females** [xx]	**0.3 females** [xx]	**insufficient data**	**no data**
Totals	**2.4 nests (2)** **1.9 females (2)**	**1.5 nests (2)** **1.3 females (1)**	**insufficient data**	**no data**

*based on data from 1989-2002
**based on data from 1995-2002
***based on data from 2000-2001
[xx]based on data from 1993-2002

To minimize the adverse impacts to sea turtle nests, all nests will be relocated from the ARG/MEU training area. While day and night nest monitoring and an egg relocation program would reduce these impacts, nests may be inadvertently missed or misidentified as false crawls during the surveys. Even under the best of conditions, about 7 percent of the nests can be misidentified as false crawls by experienced sea turtle nest surveyors (Schroeder, 1994). In addition, nests may be destroyed by training activities and moving vehicles and watercraft at night after nesting surveys are performed. Thus, 1.0 loggerhead nest and less than one green nest may be mis-identified as a false crawl and impacted from training activities (Table 2).

Besides the potential for missing nests during a nest relocation program, there is a potential for eggs to be damaged during movement or for unknown biological mechanisms to be affected. Nest relocation can have adverse impacts on incubation temperature (and hence sex ratios), gas exchange parameters, hydric environment of nests, hatching success, and hatchling emergence (Limpus et al., 1979; Ackerman, 1980; Parmenter, 1980; Spotila et al., 1983; McGehee, 1990). Relocating nests into sands deficient in oxygen or moisture can result in mortality, morbidity, and reduced behavioral competence of hatchlings. Water availability is known to influence the incubation environment of the embryos and hatchlings of turtles with flexible-shelled eggs, which has been shown to affect nitrogen excretion (Packard et al., 1984), mobilization of calcium (Packard and Packard, 1986), mobilization of yolk nutrients (Packard et al., 1985), hatchling size (Packard et al. 1981, McGehee 1990), energy reserves in the yolk at hatching (Packard et al., 1988), and locomotory ability of hatchlings (Miller et al., 1987).

Comparisons of hatching success between relocated and *in situ* nests have noted significant variation ranging from a 21 percent decrease to a 9 percent increase for relocated nests (Moody, 1998). Comparisons of emergence success between relocated and *in situ* nests have also noted significant variation ranging from a 23 percent decrease to a 5 percent increase for relocated nests (Moody, 1998). The study of hatching and emergence success of *in situ* and relocated nests at seven sites in Florida found that hatching success was lower for relocated nests in five of seven cases with an average decrease for all seven sites of 5.01 percent (range 7.19 percent increase to 16.31 percent decrease). Emergence success was lower for relocated nests in all seven cases by an average of 11.67 percent (range 3.6 to 23.36 percent) (Moody, 1998). Eglin NRB currently estimates an hatching success of 45 percent for nests left *in situ* and 34 percent hatching success for nests that are relocated. Thus, relocation at Eglin amounts to 25 percent decrease in hatch success, higher than found the studies.

A final concern about nest relocation is that it may concentrate eggs in an area resulting in a greater susceptibility to catastrophic events. Hatchlings released from concentrated areas may also be subject to greater predation rates from both land and marine predators, because the predators learn where to concentrate their efforts. The Eglin Natural Resources Branch would be responsible for the relocation of sea turtle nests and monitoring the relocated nests throughout incubation and hatching. Relocation of sea turtle nests is proposed for the years when amphibious landings and ground troop movement training activities are scheduled to be conducted.

Another impact to nesting sea turtles during the ARG/MEU is through the disruption of adult female nesting activity and by injury, entrapment or obstruction of female sea turtles attempting to nest or returning to the sea after nesting. Sea turtles that emerge onto beaches to nest often abandon their nesting attempts before putting their clutches of eggs into the sand. Reasons for this abandonment include encountering large structures on the beach. When encountering a large solid object, a turtle may continue to follow the edge of the structure or turn away seeking a suitable nest site or abort the search and return to the sea (false crawl). If a suitable nest site is not found, excessive crawling quickly depletes a turtle's energy needed for constructing a nest, laying eggs, camouflaging, and

returning to the sea. After nesting, an adult turtle that encounters a large object may be delayed in returning to the sea, become tired and more vulnerable to predators upon returning to the sea. If an object is raised off the ground, it could entrap an adult turtle if adequate clearance is not available for the turtle to pass under or through. The turtle may also perceive the structure as a change in beach topography or confuse the adult's sea-finding behavior by creating a shadow or blocking the brightness over the water. This may not result in just a simple delay in returning to the sea – but death (Witherington and Martin, 1996, 2000).

Potentially, watercraft may have to be temporarily left on the beach for a few hours up to one or two days. However, minimizing areas of potential entrapment such as under the vehicles by installing a temporary fence around the vehicles, and/or spacing the vehicles and watercraft far enough apart from each other could reduce the potential of impacts to adult nesting sea turtles. Watercraft (LCAC, LCU, AAV, and zodiacs) are proposed to be used and possibly left on the beach during R&S, MRW, MEU Landing, Direct Action, and Withdrawal. The ratio of false crawls to nests on Eglin is about 1:1, thus, 1.7 nesting females could false crawl due to disruption, entrapment, or aversion to the nesting beach. Also, while highly unlikely, moving vehicles and watercraft , while on the beach may collide with female sea turtles. Using the total number of nests and false crawls to represent the possible number of female sea turtles on the beach equals, the average annual expected number of turtles to be on the beach during a 10-day training event peak nesting would be 0.2 turtles. Thus, a total of 2.0 turtles could be injured, entrapped, or avoid nesting.

Another impact to sea turtles is disorientation (loss of bearings) and misorientation (incorrect orientation) of hatchlings from artificial lighting. Visual cues are the primary sea-finding mechanism for hatchlings (Mrosovsky and Carr, 1967; Mrosovsky and Shettleworth, 1968; Dickerson and Nelson, 1989; Witherington and Bjorndal, 1991). Artificial beachfront lighting is a well documented cause of hatchling disorientation and misorientation on nesting beaches (Philbosian, 1976; Mann, 1977; Florida Department of Environmental Protection, unpubl. data). In addition, research has also documented significant reduction in sea turtle nesting activity on beaches illuminated with artificial lights (Witherington, 1992). Therefore, any of the ARG/MEU Training activities that use lighting may deter females from coming ashore to nest, disorient females trying to return to the surf after a nesting event, or disorient and misorient emergent hatchlings from adjacent non-project beaches. Any source of bright lighting can profoundly affect the orientation of hatchlings, both during the crawl from the beach to the ocean and once they begin swimming offshore. Hatchlings attracted to light sources on watercraft in the offshore may not only suffer from interference in migration, but may also experience higher probabilities of predation to predatory fishes that are also attracted to the watercraft lights. This impact could be reduced by using the minimum amount of light necessary, shielding lights, or using low pressure sodium lights during the training.

Flares, smokes, and simulators are proposed to be used during most if not all training missions on Santa Rosa Island. It is unknown how much hand held lighting or associated lighting is expected as part of the training. Since a goal of the night training is to conduct covert operations at night, little to no lighting is anticipated to be used. The use of night vision equipment would be used.

Indirect effects

Sea turtles are thought to hear in the low frequency range of 250 to 1,000 Hz (Moein and Musick, 2003). It appears that sea turtles in the water may be able to habituate to sounds and have different tolerances at different life stages. However, female turtles coming ashore to nest may be seeking a different environment, one that is not only suitable habitat but is also a safe location to lay her eggs. Hearing random munitions may be enough to disturb a female turtle as she approaches the dry beach, or is crawling on the beach, or has started her initial nest cavity excavation. Specific data on noise or vibrations generated by helicopters was not available except that 1,000 Hz has been measured during flyovers. Troop deployment from helicopters are proposed to be conducted from an altitude of 100 feet landward of the primary dunes at sites A-15A and A-11, on any type of surface. The entire process is expected to take 5 minutes or less for each deployment. Troop deployment by helicopters is planned for all mission activity training on Santa Rosa Island (R&S, MRW, MRD, MEU Landing, Direct Action, and Withdrawal except TECG/OPFOR).

Additionally, noise from munitions use is proposed. Live fire would occur only within buildings except at site A-15; however, it would not be sustained fire. Blank firing would occur outside buildings at A-11A during the MRW, MRD, and MEU Landing. The firing is expected to occur in short, less than 1 minute bursts for approximately 5 minutes.

Minimal research has been conducted to ascertain whether nesting sea turtles are adversely affected by noise, vibrations, presence of people, or a combination. Sea turtles are most prone to human disturbance during the initial phases of nesting when they emerge from the sea, select a nest site, and excavate the egg chamber (Hirth and Samson, 1987 as cited in Witherington and Martin, 1996, 2000). Witherington and Martin (1996/2000) also noted that the presence of people moving within the field of view of a turtle may cause abandonment of the nesting process. Although sea turtles are less prone to abandon nesting attempts once egg deposition has begun, the normal post-egg laying behavior of covering and camouflaging the nest site can be abbreviated if a turtle is disturbed. Studies have shown that "watched" and hand-illuminated nesting turtles have shorter than average nest covering and camouflaging times (Johnson *et al.,* 1996 and Hirth and Samson, 1987 as cited in Witherington and Martin, 1996).

The ARG/MEU Training regardless of when it is conducted may affect the stability, topography, and ecological integrity of Santa Rosa Island. Effects from the ARG/MEU Training events may continue to affect sea turtle nesting on the beach and adjacent beaches in future years.

Changes in sand density (compaction), beach shear resistance (hardness), beach slope could result in adverse impacts on nest site selection, digging behavior, clutch viability, and emergence by hatchlings. Beach compaction and unnatural beach profiles that may result from the training activities could negatively impact sea turtles regardless of the timing of projects. The use of heavy equipment, watercraft, or vehicles can cause sand compaction. Significant reductions in nesting success (i.e., false crawls occurred more frequently) and the increased false crawls may result in increased physiological stress to nesting females. Sand compaction may increase the length of time

required for female sea turtles to excavate nests and also cause increased physiological stress to the animals.

The dynamic coastal barrier island is important in not just providing habitat for endangered species but as protection for inland areas, acting as a buffer against wind and waves on a daily basis and probably more importantly, during hurricanes and other severe weather events. However, dunes are fragile and can be easily eroded or worn away. Dunes are created by the sand blown in from the beach accumulating around plants. The dunes increase in size as the plant roots trap and stabilize the shifting sands. When the plants are destroyed, the sand becomes loose and can be easily blown away. Sometimes blowouts or weak spots are formed (Florida Department of Community Affairs and 1000 of Friends of Florida, 1995; Earnest and Kuehn, 1994; Barnett and Crewz, 1990). Physical destruction of the dunes may cause accelerated beach erosion by allowing water to penetrate further inland and by reducing the amount of sand that may be deposited on the beach from the receding water. This results in the decrease of available beach habitat for sea turtle nesting.

Experimental dune restoration research on Santa Rosa Island indicates that it takes four to six years for the dunes to rebuild naturally after a hurricane (Petrick, 2002; Miller *et al.,* 1999). Thus, it is necessary to protect the beach and dune habitat from physical perturbations such as loss of vegetation. If dune habitats are quickly replanted with dune vegetation following ARG/MEU Training completion, effects would be minimized. Troop movement is to be conducted within the dune habitat, troops are used in all ARG/MEU Training activities except TECG/OPFOR. In addition, site A-13B has been designated as the island crossover corridor. The crossover site is currently denuded of most vegetation and continued and repeated use of the site has created a weak spot in the island. This site is currently subject to overwash during storms and could blow out in a severe storm forming an inlet. Alternating crossover sites and the width of the crossover corridor would reduce some of the effects. At the water ingress and egress areas at sites A-11 and A-10, weak spots in the dunes may be created by repeated landing of watercraft. Keeping the watercraft off the foredunes and the primary dunes would minimize the potential for weak areas to form.

Flatwoods Salamander

Analysis for Effects of the Action

Direct and Indirect Effects

The Service concurs with the findings of the biological assessment summarized in Table D-6 on page D-17 of that document. The only action that has the likely potential to affect flatwoods salamander is the ground movement by way of tracked vehicles during the MEU Landing activities. Tracked vehicles would require that a tank trail be constructed adjacent to an existing asphalt road that traverses flatwoods salamander habitat. This could result in mortality of animals during construction and with increased traffic. Also there is a permanent loss of habitat within the tank trail. It could also result in indirect take by increasing the width of the existing impediment to migration corridors. Other potential impacts are adequately described in Appendix D of the biological assessment.

Flatwoods salamanders are thought to be sensitive to any soil and groundcover disturbing activities within its habitat, especially when that disturbance creates an impediment to movement from upland habitat to the ephemeral wetlands they use for breeding and larval development. Soil disturbance can also result in potential sedimentation and erosion affecting nearby wetlands habitat. However, the limited construction that would be required is not expected to directly affect breeding habitat or create significant changes to the natural flow and deposition of water.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the designated ARG/MEU Training area considered in this biological opinion. Ongoing mission activities occur within the training area on a one-time or continuing basis; future federal actions that are unrelated to the proposed project are not considered in this opinion because they require separate consultation pursuant to section 7 of the Endangered Species Act. Existing land uses adjacent to the action area are primarily a combination of conservation and limited military operations. The southern boundary is high density single family residential subdivisions that are mostly "built out." These developments and the proximity of Highway 98 require that Eglin conduct an aggressive fire management program in the area. The Service is not aware of any cumulative effects in the area selected for the ARG/MEU Training

CONCLUSION

After reviewing the current status of the flatwoods salamander, loggerhead, green, leatherback, and Kemp's ridley sea turtles, the environmental baseline for the ARG/MEU Training area on Santa Rosa Island and the Eglin Main Base, the effects of the training, proposed conservation measures, and the cumulative effects, it is the Service's biological opinion that the project, as proposed, is not likely to jeopardize the continued existence of the flatwoods salamander and above listed sea turtle species. No critical habitat has been designated for the flatwoods salamander; therefore, none would be affected. No critical habitat has been designated for the sea turtles in the continental U.S.; therefore, none would be affected.

The proposed project would directly and indirectly affect approximately 70 acres of sea turtle nesting habitat along approximately 7.0 miles of Gulf of Mexico beachfront. This area accounts for 0.5 percent of the approximately 1,400 miles of available sea turtle nesting habitat in the southeastern U.S. It is estimated that during a 10-day ARG/MEU Training event, two loggerhead sea turtle nests and two female sea turtles, about one leatherback sea turtle nest and one female turtle annually; and two green sea turtle nests and one female turtle. No take of Kemp's ridley sea turtle nests or female turtles are anticipated.. The loss of both the nests and female sea turtles will not appreciably reduce the survival and the recovery of the loggerhead (2 nests out of 70,000 annually), green (2 nests out of 10,000 nests), or leatherback (1 nests out of 150) in the wild. Furthermore, incorporating measures in the training activities or conducting additional sea turtle nesting surveys and relocating nests from harm's way is expected to reduce the potential risk of the activities affecting nesting sea turtles, nests, eggs, and hatchlings.

INCIDENTAL TAKE STATEMENT

Section 9 of the Endangered Species Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered or threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include major habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to noticeably disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, carrying out an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.
The measures described below are non-discretionary, and must be implemented by Eglin AFB or the U.S. Marine Corps for the exemption in section 7(o)(2) to apply. Eglin AFB has a continuing duty to regulate the activity covered by this incidental take statement. If Eglin AFB (1) fails to assume and assure implementation of the terms and conditions or (2) fails to require the U.S. Marine Corps to adhere to the terms and conditions of the incidental take statement through enforceable terms, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, Eglin AFB must report the progress of the project and its impacts on the species to the Service as specified in the incidental take statement [50 CFR §402.14(I)(3)].

<u>Amount or Extent of Take</u>

Sea Turtles

The Service has reviewed the biological information and other information relevant to this action. Based on this review, incidental take is anticipated for (1) all sea turtle nests that may be laid and eggs that may be deposited and missed by the day and night nesting surveys and egg relocation program within the boundaries of the ARG/MEU Training area; (2) all sea turtle nests deposited during the period when a nest survey and egg relocation program is not required to be in place within the boundaries of the the ARG/MEU Training area; (3) harassment in the form of entrapping, disturbing or interfering with female sea turtles attempting to nest or returning to the sea after nesting within the ARG/MEU Training area; (4) injury to a female sea turtle on the beach from collision with ARG/MEU Training watercraft: (5) misorientation or disorientation of hatchling turtles on adjacent non-training beaches as they emerge from the nest and crawl to the water; (6) behavior modification of nesting female sea turtles due to shoreline configuration changes resulting from the vehicles, watercraft or earth movers within the ARG/MEU Training area during a nesting season, resulting in false crawls or situations where they choose marginal or unsuitable nesting areas to deposit eggs; and/or (7) reduced hatching success due to egg mortality during relocation and

adverse conditions at the relocation site.

Incidental take is anticipated from the occurrence of the ARG/MEU Training one or two times during the sea turtle nesting season each year for an undetermined amount of years. The Service anticipates incidental take of sea turtles would be difficult to detect for the following reasons: (1) the inability to predict if and when the ARG/MEU Training may occur during the sea turtle nesting season, (2) sea turtles nest primarily at night and all nests are not found because of human error and natural factors, such as rainfall, wind, and tides may obscure crawls and result in nests being destroyed because they were missed during a nesting survey and egg relocation program; (3) hatchling sea turtles typically emerge from the nest at night and all hatchlings affected may not be found as a result of predation, dessication or being washed away, or (4) an unknown number of female sea turtles may avoid the beach and be forced to nest in a less than optimal area; and (5) behavior modification of nesting females or hatchlings due to noise or vibrations from munitions fire, helicopter, and troops, vehicles, and watercraft on the beach or in the dunes.

If the ARG/MEU Training does take place within the sea turtle nesting season, adverse effects to sea turtle nests within approximately 70 acres of nesting habitat along 7.0 miles of Gulf of Mexico beachfront can be anticipated. The number of nests per a 10-day training event within the nesting season could include two loggerhead sea turtle nests and two female sea turtles annually, one leatherback sea turtle nest and one female turtle annually; and two green turtle nests and one green female turtle bi-annually. No take of Kemp's ridley sea turtle nests or female turtles is anticipated.

Flatwoods Salamander

The Service has determined that incidental take of flatwoods salamanders is difficult to detect for the following reasons: (1) adult flatwoods salamanders are difficult to locate and observe. Individuals killed during construction would likely be buried under dirt and debris. (2) losses may be masked by natural fluctuations in numbers of individuals.

Although mortality of individuals is difficult to document, the level of take of this species was determined as follows: An estimated 10,560 square feet of good quality buffer habitat was presumed to be taken by road construction.

Effect of the Take

Sea Turtles

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to loggerhead, green, leatherback, or Kemp's ridley sea turtles. Critical habitat has not been designated within the 7-mile ARG/MEU Training area; therefore, the project would not result in destruction or adverse modification of critical habitat for loggerhead, green, leatherback, or Kemp's ridley sea turtles.

Incidental take of nesting and hatchling sea turtles is anticipated to occur during the ARG/MEU Training events for undetermined number of years. The take would occur on nesting habitat consisting of the 7.0 miles of beachfront. However, measures to reduce potential impacts to nesting females, their nests and eggs, and hatchling have been incorporated into the ARG/MEU Training activities.

Flatwoods Salamander

In the accompanying Biological Opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the species. No critical habitat has been desiginated for the flatwoods salamander; therfore none will be affected.

Reasonable and Prudent Measures

Sea Turtles

The Service believes the following reasonable and prudent measures (RPMs) are necessary and appropriate to minimize take of sea turtles as a result of the ARG/MEU training on the restricted Gulf of Mexico beach on Santa Rosa Island controlled by Eglin.

1. During the years that the ARG/MEU Training would be conducted, a sea turtle nest relocation program must be implemented on Santa Rosa Island within the 7-mile area where the training would occur.

2. Only site A-13 must be used as the crossover site for the ARG/MEU Training events.

3. Only sites A-10, A-11, and A-13A must be used for the ARG/MEU Training amphibious watercraft ingress and egress.

4. Only sites A-10, A-11, and A-11A must be used for the ARG/MEU Training land-based vehicle and equipment access corridors.

5. Activities within the Troop Movement corridor of the ARG/MEU Training must follow all applicable restrictions to movement within the corridor as provided verbally, written, or indicated on the ground.

6. Lateral movement areas of vehicles or watercraft along the beachfront must be clearly designated within the 7-mile ARG/MEU Training area.

7. Participants in the ARG/MEU Training on Santa Rosa Island, must be informed and cognizant of the potential effects of human presence and the ARG/MEU Training activities on sea turtles and behave accordingly as instructed.

8. Boundaries of the ARG/MEU Training area, corridors, etc. on Santa Rosa Island must be

clearly delineated on the ground and provided in a map to all ARG/MEU Training participants.

9. Equipment and debris must be removed from the 7-mile ARG/MEU Training area within 24 hours following completion of the 10-day training event. Eglin must ensure that the clean up is adequate and completed.

10. Eglin must ensure that beach and dune habitats impacted by the ARG/MEU Training on Santa Rosa Island, are appropriately restored in a timely manner with concurrence from the Fish and Wildlife Service.

11. Eglin must ensure that the terms and conditions are accomplished and completed as detailed in this incidental take statement including completion of reporting requirements.

Flatwoods Salamander

RPMs for Tracked Vehicle Ground Movement

1. Restrict activities in isolated wetlands and within good condition primary buffers.

2. When it is impossible to avoid flatwoods salamander habitat, confine impacts to poor buffer habitat versus high quality buffer habitat as determined by AAC/EMSN surveys.

3. Avoid mounding of materials on sides of the road.

4. Place RR259 tank trail on east side of the existing road near flatwoods salamander habitat.

5. For road improvement/construction activities along RR259, RR668, and RR253, employ BMPs outlined in the Range Road Maintenance Guidebook.

6. South of East Bay River, restrict large troop movements to established roads.

7. For pyrotechnics, follow Eglin's Wildfire Specific Actions Guide Restrictions.

Terms and Conditions

Sea Turtles

In order to be exempt from the prohibitions of section 9 of the Endangered Species Act, Eglin must comply with the following terms and conditions, which implement the reasonable and prudent measure described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

1. Habitat Protection, Restoration, and Maintenance

A. Troop Movement Corridor

1. From May 1 through October 15, the Troop Movement Corridor east and west boundaries must be clearly posted or marked on the ground and on maps provided to participants of the ARG/MEU training.

   All posting or marking of the 7-mile ARG/MEU Training boundary would be checked by Eglin Natural Resources Branch or their designee daily. Missing posts or other marking material must be replaced within 24 hours of discovery.

2. No Troop Movement must be permitted on dunes, vegetated or unvegetated, that are 5 feet or higher.
3. No equipment or vehicles are allowed on, between, or within dune habitat.

4. Conditions and restrictions to activities within the Troop Movement Corridor must be provided to all participants in verbal and written form and delineated on the ground.

B. Fighting Positions

Fighting holes, trench systems, vehicle or equipment traps, artillery bunkers, etc. must be refilled and leveled after the training activity is finished.

C. Crossover and Watercraft Ingress and Egress Landing Zones.

1. The crossover site at A-13B and amphibious craft ingress and egress zone at A-11 and A-10 must be designated and clearly marked during the ARG/MEU Training events.

2. During crossovers at A-13B, all vehicles or watercraft must vary their path within the designated corridor to prevent excessive soil erosion within the crossover site.

D. Lateral Beach Movement of Vehicles and Watercraft

1. Lateral movement of vehicles and watercraft along the beachfront must only occur between test sites A-11A and A-15.

2. Watercraft and vehicle movement must be as close the waterline as possible and at least 50 feet below the toe of the primary dune.

3. During the nesting portion of the sea turtle nesting season, from May 1 through August 30, all holes or disturbed areas 2 feet or larger in diameter created as a result of vehicle or watercraft movement must be refilled immediately after the training exercise is over.

E. Evaluation and Restoration of Habitats

1. Within one week after each 10-day ARG/MEU Training event, Eglin must conduct an assessment of the impacts to beach and dune habitats. Following the assessment and in coordination with the Fish and Wildlife Service (Service) and in accordance with the INRMP, a plan of action must be determined and implemented as appropriate. A summary of the plan of action, implementation, and success evaluation must be provided in the annual report to the Service.

2. All dune restoration must be designed and conducted to minimize impacts to sea turtles in accordance with Florida Department of Environmental Protection guidelines.

F. Informing the ARG/MEU Training Participants about Habitat Protection

1. Eglin AFB must ensure that participants in the ARG/MEU Training understand the need to protect beach and dune habitat during the training activities.

2. Eglin AFB must ensure that the protection of habitat would be implemented by the marking of the habitat boundary, posting no entry areas, and/or providing verbal and written communication to the participants of the training event.

2. Species Protection

A. A sea turtle nest relocation program must be implemented on INBS zones 1 - 9 and 14 - 19, including the crossover site A-13B, and water ingress and egress sites at sites A-11 and A-10, on Santa Rosa Island during the years that the ARG/MEU would be conducted between May 1 and November 30.

1. Daily morning nesting surveys must be initiated 80 days prior to ARG/MEU Training activities or by May 1, whichever is later. Nesting surveys must continue through the end of the training activities or through September 1, whichever is earlier. Hatching and emerging success monitoring would involve checking nests beyond the completion date of the daily early morning nesting surveys.

2. If nests are laid in areas where they may be affected by the ARG/MEU Training activities, eggs must be relocated per the following requirements.

a. Nest surveys and egg relocations must be conducted by personnel with prior experience and training in nest survey and egg relocation procedures. Survey personnel must have a valid Florida Fish and Wildlife Conservation Commission permit. The daily nesting surveys must be conducted daily between half hour before sunrise and 9 a.m. Surveys must be performed

in such a manner so as to ensure that the nests are removed from the training area before the training activities can begin.

b. Nests deposited within areas where ARG/MEU Training activities have ceased or would not occur for 80 days shall be marked and left *in situ* unless other factors threaten the success of the nest. An on-beach marker at the nest site and a secondary marker at a point as landward as possible must be installed to assure that future location of the nest would be possible should the on-beach marker be lost. Nest sites shall be inspected daily to assure nest markers remain in place and the nest has not been disturbed.

c. Only those nests that may be affected by the ARG/MEU Training activities within the 80-day window may be relocated. During the daily nesting surveys, nests requiring relocation shall be moved no later than 9 a.m. the morning following deposition. The nests must be moved to a self-release beach site in a secure setting unaffected by the training activities, other missions, or where artificial lighting would not interfere with hatchling orientation on Santa Rosa Island. The relocated nests must be placed in a manner that does not create a hatchery situation. Nest relocations in association with the ARG/MEU Training activities shall cease when training activities no longer threaten nests or nesting.

d. Between May 1 and September 31, on the nights that ARG/MEU Training would be conducted, a one-time nesting survey must be completed on the beaches where training activities, including water ingress and egress sites, would occur or be located. The survey must be accomplished between sunset and midnight on the night of the activity. All nests located during the surveys must be relocated in accordance with paragraph A.2.c. above.

e. The survey must include geographic position data collection at the original and the relocated nest site. The geographic data must be incorporated into Eglin's geographic information system.

B. Beachmaster Camps

During the sea turtle nesting season from May 1 through October 31, all Beachmaster Camps set up in association with the ARG/MEU Training must be located off the beach. All lighting associated with the Beachmaster Camps must be limited to the immediate area of the camp only and must be the minimal lighting necessary to comply with safety requirements and training needs. Lighting shall be minimized through reduction, shielding, lowering, and appropriate placement of lights to prevent the glowing portion of any luminaries (including the lamp, globe, or reflector) from being directly visible from anywhere on the beach.

C. Emergency Contact - Endangered Species at Eglin

1. From May 1 to November 30, Eglin must provide a 24-hour contact to the ARG/MEU training participants that would be available to respond or to handle emergencies related to harm or injury to sea turtles and to answer questions related to endangered species and the training activities.

2. If a turtle crawl is seen on the beach during day time or nighttime hours with no associated marked nest, the appropriate Eglin Natural Resources Branch, their designee, or the 24-hour contact must be immediately notified. Care must be taken not to disturb the crawl and/or nest site.

D. Lighting

1. From May 1 through November 30, all direct lighting of the beach and near shore waters associated with the ARG/MEU training activities must be limited to the immediate training area.

2. Lighting on offshore or onshore equipment must be minimized through reduction, shielding, lowering, and appropriate placement to avoid excessive illumination of the waters surface and nesting beach.

E. Lateral Beach Movement of Vehicles and Watercraft

1. Lateral movement of vehicles and watercraft along the beachfront must only occur between test sites A-11A and A-15. Vehicle movement must be as close to the waterline as possible and at least 50 feet below the toe of the primary dune.

2. Equipment, vehicles and watercraft must be staged at the water's edge, if feasible. Whenever it is impractical or necessary to stage vehicles and watercraft on the beachfront, the following applies.

   a. If the equipment, vehicles, and watercraft are to be left on the beach for one night or less, a surveyor must be stationed near the vehicles and watercraft to watch for adult sea turtles coming ashore to nest.

      If a sea turtle is observed on the beach near the staged vehicles or watercraft, the surveyor must remain quiet and outside the turtle's field of vision.

      If the sea turtle nests and the nest would be in harm's way of the

training activities occurring that night, Eglin Natural Resources Branch or their designee must be called immediately to relocate the eggs. Eglin, their designee, or 24-hour contact must document the event on a nesting survey datasheet. Training may proceed after the Eglin contact has been made. If the nest would not be in harm's way of the training activities, the nest area and crawl must be marked and protected for relocation during the morning nesting survey.

If the sea turtle becomes or appears to be entangled or disoriented, actions to ameliorate impacts must be accomplished immediately. The responder must document the event on a stranding datasheet.

b. If the equipment, vehicles, and watercraft are to be left on the beach for more than one night following a training event, a barrier around each of the vehicles or watercraft must be installed to prevent the movement of adult sea turtles underneath the vehicles and becoming entrapped, misoriented, or disoriented. The barrier must be composed of a material, be of a height and installed so that adult turtles cannot knock it down, or crawl over it and hatchlings cannot crawl beneath it. The Eglin NRB will be responsible for relocating any nest or rescuing a female turtle during the daily survey.

F. Predator Control

Eglin must continue to participate and implement predator control on Santa Rosa Island to ensure predation of sea turtles and their nests is maintained at a rate of less than 5 percent.

G. Dune Restoration

1. Planting of dune vegetation may be implemented during the turtle nesting season (May 1 through November 30) but must incorporate the following conditions:

   a. Daily early morning nesting surveys would be required during the period from May 1 through September 1. Nest surveys must only be conducted by personnel with prior experience and training in nest surveys. Survey personnel must have a valid Florida Fish and Wildlife Conservation Commission permit. Nest surveys must be conducted daily between ½ hour before sunrise and 9 a.m. No dune planting activity would occur until after the daily turtle survey and nest conservation and protection efforts have been completed.

   b. Nesting surveys must be initiated 80 days prior to dune planting activities

or by May 1, whichever is later. Nesting surveys must continue through the end of the project or through September 1. Hatching and emergence success monitoring would involve checking nests beyond the completion date of the daily early morning nesting surveys.

c. Any nests deposited in the dune planting area not requiring relocation for conservation purposes shall be left *in situ*. An on-beach marker at the nest site and a secondary marker at a point as far landward as possible must be installed to assure that future location of the nest would be possible should the on-beach marker be lost. A series of stakes and highly visible survey ribbon or string must be installed to establish an area of 3 feet radius surrounding the nest. No planting or other activity would occur within this area nor would any activity occur which could result in impacts to the nest. Nest sites must be inspected daily to assure nest markers remain in place and the nest has not been disturbed by the planting activity.

d. If a nest is disturbed or uncovered during planting activity, all work must cease and Eglin Natural Resources Branch or the 24-hour contact must be immediately contacted. If a nest(s) cannot be safely avoided during planting, all work within the affected project site must be delayed until hatching and emergence success monitoring of the nest is completed.

e. All dune planting activities must be conducted during daylight hours only.

f. All dune vegetation must consist of plant species native to the area and be planted in accordance with Florida Department of Environmental Protection guidelines.

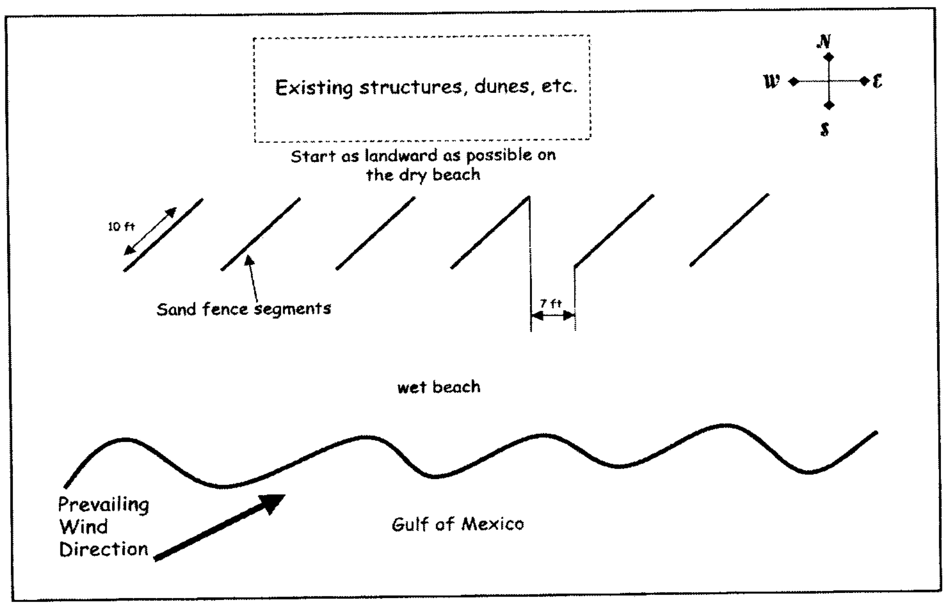
g. No use of heavy equipment (trucks) are allowed on the dunes. A lightweight (ATV type) vehicle, with tire pressures of 10 psi or less may be operated on the beach.

h. All irrigation, if proposed, must be installed by hand labor or tools and entrenched 1 to 3 inches below grade so as not to pose a barrier to hatchling turtles and to allow for easy removal. The irrigation system must be designed and maintained so that watering of the adjacent sandy beach does not occur. If a turtle nest is deposited within the newly established planted dune area, the applicant must modify the irrigation system so that no watering occurs within 10 feet of the nest. Daily inspection of the irrigation system must be conducted to assure the irrigation system is properly working and meets the above conditions. The irrigation system must be completely removed once watering is no longer needed or before May 1, of the next year.

2. Any sand fencing or other dune restoration material placed in the restoration area must be installed as follows:

   a. A maximum of 10 foot- long spurs of parallel fence spaced a minimum of 7 feet apart must be installed on a northeast-southwest (diagonal) alignment (below schematic).

   b. All fence material must be repositioned as necessary to facilitate dune building and must be removed when 30 percent of the fence is covered with sand.



3. Species Monitoring

   A. Eglin AFB must continue implementing their sea turtle nesting survey program in accordance with FWC permit requirements.

      1. During the years that ARG/MEU Training would be conducted, daily early morning sea turtle nest surveys must be conducted from May 1 through September 1. Frequency of hatching and emerging success monitoring after September 1, must involve checking nests based on expected nest hatched dates.

      2. Nest surveys must only be conducted by personnel with experience and training in nest survey procedures. Surveyors must have a valid State of Florida FWC permit. Nest surveys must be conducted daily between half hour before sunrise and 9 a.m.

Data gathered during the survey must be in the form required by the FWC permit. The survey must include geographic position data collection and the data must be incorporated into Eglin's geographic information system.

3. Except within the 7-mile area of the ARG/MEU Training during the years the trainings events would take place, nests deposited on Santa Rosa Island must be marked and left *in situ* unless relocation is in compliance with FWC guidelines.

4. All sea turtle nests must be marked. The nest marking may be in the form of a predator-proof cage or other marking in accordance with Eglin's FWC permit and guidelines and conspicuous to personnel working, driving vehicles or operating equipment on the beach. Once a nest is marked or it is determined that there is no nest and it is a false crawl, the crawl must be obliterated so that it is obvious that the site has been checked.

5. Nest sites must be inspected daily to assure nest markers remain in place and the nest has not been disturbed.

6. Eglin NRB must conduct an analyses of historic nesting data to ascertain the week(s) of peak nesting of loggerhead and green sea turtles. The ARG/MEU Training must avoid these week(s).

B. Eglin must continue to participate in the State of Florida's Sea Turtle Stranding and Salvage Network. All strandings must include geographic position data collection and the data must be incorporated into Eglin's geographic information system

4. Information to Participants of the ARG/MEU Training Events

1. Eglin must implement an outreach program including a Handbook to inform participants of ARG/MEU Training about sea turtles and the significance of the species in the coastal ecosystem, and the importance of protecting and contributing to their conservation.

2. The handbook must include guidance to the training participants on the actions needed if a sea turtle is seen on the beach during training activities.

5. Reporting

A. All Eglin military and civilian personnel involved in any aspect of the ARG/MEU Training activities and events on Santa Rosa Island must be notified that upon locating a sea turtle adult, hatchling, or egg that has been harmed or destroyed, contact must be made with the Eglin Natural Resources Branch. Eglin Natural Resources Branch, their designee, or the 24-hour contact would be responsible for notifying the Florida Fish and Wildlife Conservation Commission Stranding and Salvage Network by Pager: 1-800-241-4653, ID#274-4867; and the U.S. Fish and Wildlife Service Office located in Panama City,

Florida at (850) 769-0552. Care should be taken in handling injured turtles or eggs to ensure effective treatment or disposition, and in handling dead specimens to preserve biological materials in the best possible state for later analysis.

B. A report describing the actions taken to implement the terms and conditions of this incidental take statement must be submitted to the Project Leader, U.S. Fish and Wildlife Service, 1601 Balboa Avenue, Panama City, Florida, 32405, within 60 days for each year in which the ARG/MEU Training is conducted. This report would include the dates of the training activities, assessment and plan of action to address impacts to sea turtle and their habitats within the 7-mile training area on Santa Rosa Island, descriptions and locations of self-release beach sites, nest surveys (day and night) and relocation results, and hatching and emerging success of nests. During years that the ARG/MEU does not take place, a negative report is still required, with sea turtle nesting survey data for the year.

Flatwoods Salamander

1. Maps and species information would be provided to road construction crews.

2. The width of a right-of-way for the tank trail would be restricted to the absolute minimum necessary to accommodate the equipment (generally 15 feet).

3. The tank trail would be located immediately adjacent to the existing road.

4. Silt fencing would be installed adjacent to roads in areas of "good quality buffer habitat" as described on Page D-16 of the biological assessment. However, the fencing would be removed during times little or no traffic is expected.

5. Eglin NRB and/or SAIC staff would inspect final construction alignment plans for the tank trail and would conduct further field inspections as necessary to determine habitat quality within the buffer zones.

6. No troop movement will occur in adjacent isolated wetlands. Nor will natural hydrology to these wetlands be impaired

The Service believes that incidental take would be limited to the 7.0 miles of beach that have been identified as the ARG/MEU Training area for an undetermined amount of years. The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize incidental take that might otherwise result from the proposed action. With implementation of these measures, the Service believes that incidental take of sea turtles as a result one 10-day AGR/MEU Training event would only include the following: (1) two loggerhead sea turtle nests, one leatherback sea turtle nest and two green sea turtle nests that may be laid and eggs that may be deposited and missed by the day and night nesting surveys and egg relocation program within the boundaries of the ARG/MEU Training area; (2) all sea turtle (all species) nests deposited during the period when a nest

survey and egg relocation program is not required to be in place within the boundaries of the the ARG/MEU Training area; (3) harassment in the form of entrapping, disturbing or interfering with female sea turtles (all species) attempting to nest or returning to the sea after nesting within the ARG/MEU Training area; (4) injury of two loggerhead turtles and one leatherback female annually and one green female turtle bi-annually from collisions with watercraft or vehicles on the beach; (5) misorientation or disorientation of hatchling turtles (all species) on adjacent non-training beaches as they emerge from the nest and crawl to the water; (6) behavior modification of nesting female sea turtles (all species) due to shoreline configuration changes resulting from the vehicles, watercraft or earth movers within the ARG/MEU Training area during a nesting season, resulting in false crawls or situations where they choose marginal or unsuitable nesting areas to deposit eggs; and/or (7) reduced hatch and emergence success due to egg mortality during relocation and adverse conditions at the relocation site. The amount or extent of incidental take for sea turtles would be considered exceeded if the ARG/MEU Training activities is expanded in size or the boundary changes from the current the 7.0 miles designated along the beach front on Santa Rosa Island.

If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. Eglin must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Endangered Species Act (Act) directs federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

ARG/MEU Training

Marine Corps

1. The Marine Corps should, whenever possible, schedule the ARG/MEU Training on Santa Rosa Island, outside the sea turtle nesting season from December 1 through April 30. Conducting the training outside of the nesting season eliminates the direct impacts of the training activities on nesting and hatchling sea turtles. We strongly encourage that the training not be conducted in June and July.

2. The Marine Corps should consider using only a portion of the ARG/MEU Troop Movement corridor for each training event and rotating the areas used every year on Santa Rosa Island to decrease the potential for impacts to the dune habitat on the island. Reducing impacts to the dune habitats helps maintain the stability and ecological integrity of the barrier island to ensure

the continued support of sea turtle nesting habitat. In addition, maintenance of the dune habitat would ensure the conservation of the Santa Rosa beach mouse, alleviating the need for the species to require federal protection in the future. Preferably the Troop Movement corridor should be divided into 3 or 4 sections for the use/rotation schedule.

3. The Marine Corps should consider eliminating from use the designated Coastal Protection Areas within the ARG/MEU Training corridor on Santa Rosa Island. These areas have been designated by the Florida Natural Areas Inventory as areas in their natural state and undisturbed condition. Eliminating impacts from ARG/MEU Troop Movement would protect these areas as representative habitats of the barrier island in its natural state.

Eglin

1. Eglin should work with the Marine Corps to schedule the ARG/MEU Training events on Santa Rosa Island during times (season and time of day or night) to reduce potential impacts to listed species and their habitats and to maintain the integrity of the barrier island.

2. Eglin should work with the Marine Corps to use only a portion of the ARG/MEU Troop Movement corridor for each training event and rotating the areas used every year on Santa Rosa Island. Preferably the Troop Movement corridor should be divided into 3 or 4 sections for the use/rotation schedule.

3. Eglin should work with the Marine Corps to reduce impacts from the ARG/MEU Troop Movement corridor on the Coastal Protection Areas on Santa Rosa Island as designated by the Florida Natural Areas Inventory. By protecting these areas, these undisturbed habitats would remain in their natural state as representative habitats of the barrier island.

Santa Rosa Island - Mission, INRMP, and Recreational Use

1. Complete the Beach Management Component of the INRMP (deadline date from INMRP biological opinion - February 1, 2003).

2. Initiate section 7 consultation for mission activities on Eglin managed lands, Santa Rosa Island.

Species & Ecosystem Specific

Piping Plover

1. Continue habitat protection for piping plover.

2. Continue participating in the International Piping Plover Census. Initiate monitoring of piping plover bi-monthly in accordance with provide survey guidance.

3. Provide the Fish and Wildlife Service, Panama City, Florida Field Office with results of the

piping plover surveys including negative survey data.

Shorebirds

1. Continue habitat protection and monitoring of the snowy plover so that federal protection of the species is not required in the future.

2. Continue protection of shorebird nesting habitat between the Beach Club and the Destin Pass jetties that has been closed to the public to protect nesting shorebirds. The area is delineated by perimeter signs and consists of about 46 acres. Signs have been installed in these areas.

Santa Rosa Beach Mouse

1. Continue habitat protection, predator control, and track survey monitoring of the Santa Rosa beach mouse so that federal protection of the subspecies is not required in the future.

2. Continue protection of Santa Rosa beach mouse habitat from pedestrian traffic in the two areas south of U.S. Highway 98 by maintaining the installed sand fence. One area is located between the Okaloosa County Beasly Park and the parking lot of the old Airman's Club and covers about 31 acres. The second area is between Princess Beach and the Beach Club and consists of about 26 acres. Signs have been installed that read "Keep Out Endangered Species."

Barrier Island Ecosystem

1. Construct dune walkovers and parking areas where appropriate to protect dune habitats at beach access points on the portion of Santa Rosa Island open to the public.

2. Continue dune restoration and protection as needed.

3. Place informational signs about barrier islands and the species the ecosystem supports at beach access points where appropriate to increase public awareness. The signs should describe the importance of the beach and dunes to conservation of the species and protection of inland habitats.

4. Implement the following procedures when driving on the beach (except in emergency situations) to minimize impacts to barrier island habitats.

    a. If feasible, drive vehicles on the beach that have tire pressures equal to or less than 10 psi.

    b. Do not drive vehicles on or across the dunes.

    c. From May 1 through November 30, all driving along the beach shoreline shall be seaward of the wrack or debris line (previous high tide) or just above it during high tide

conditions.

d. From November 1 through April 30, all driving along the beach shoreline shall be just landward of the wrack or debris line (previous high tide).

Marine Mammals

Continue to participate in the marine mammal stranding network.

Florida Perforate Lichen

1. Minimize impacts to the Florida perforate lichen, by incorporating the following into the Beach Management Component that would be developed:

   A. Habitat Protection, Restoration, and Maintenance

      1. Continue to maintain the exclusion areas, beach access points, and designated foot trails on the public use portion of Santa Rosa Island to protect habitats of Florida perforate lichen.

      2. Consider other habitat protection measures for the Florida perforate lichen to assure the best protection is being implemented on the north and south sides of U.S. highway 98. The following measures should be considered but not be limited to:

         a. install boardwalks where fence installation is not feasible,

         b. create additional parking at un-used facility sites (such as at site A-2),

         c. coordinate and work with Florida Department of Transportation to provide signs to clearly identify parking sites,

         d. implement appropriate measures to assure funneling of beach goers to beach access points and foot trails (additional fence and wing wall installation),

         e. partner with the local community to provide and manage parking, beach access, trash pick up, and enforcement of habitat protection.

      3. Ensure dedicated enforcement of Florida perforate lichen protection is in place and implemented especially during periods of high public use such as spring break, holidays, and weekends during the summer season. Enforcement would include the proper use of beach accesses and foot trails and adherence to the exclusion areas by beach goers.

4. Design all dune restoration and vegetation planting to minimize impacts to occupied and suitable but unoccupied habitat of the lichen.

B. Ensure Eglin personnel and their contractors abide by the Okaloosa County ordinance that prohibits the use of clay or fill material on Santa Rosa Island to control the invasion of exotic plants and unsuitable material into the habitat of the lichen.

C. Continue to participate and implement predator control on Santa Rosa Island to ensure that excessive trampling of the Florida perforate lichen by wildlife does not occur.

D. Enforce prohibitions regarding malicious destruction or possession without a permit of Florida perforate lichen by notifying all Eglin military and civilian personnel that upon documenting an incident, contact must be made with the Eglin Branch of Natural Resources and the U.S. Fish and Wildlife Service Office located in Panama City, Florida at (850) 769-0552.

E. Florida Perforate Lichen Monitoring and Research

1. Consider the funding and/or logistical support of genetic research of the lichen.

2. Accomplish a survey to ascertain the occupied and suitable but unoccupied habitat of the lichen on Santa Rosa Island, so that potential impacts to the species can be minimized. The survey should include geographic position data collection and incorporation of the data into Eglin's geographic information system.

3. Implement a monitoring program on Santa Rosa Island, so that the status of the lichen's populations can be monitored. This monitoring should include the newly re-introduced populations as well as the population on site A-2 north of US Highway 98.

4. Implement monitoring of the re-introduced lichen populations on the restricted beach in accordance with the researcher's guidelines to assure that accurate and statistically meaningful data is collected to assess population changes.

5. Provide copies of any annual or final survey reports to the Fish and Wildlife Service on the lichen on the public use portion and the re-introduced population on the restricted portion of Santa Rosa Island.

<u>Flatwoods salamander</u>

1. If any sections of the existing RR 259 are abandoned, Eglin AFB would restore the topography

and vegetation of the alignment.

2. Eglin AFB would implement measures to limit unauthorized access through the urban interface at the southern and southwestern boundary.

3. Eglin AFB would create a defensible fire break along the southern boundary to facilitate future prescribed burning and to increase future fire fighting options.

4. Flatwoods salamander areas would receive top priority for prescribed burning.

5. Eglin AFB would monitor the action areas, including monitoring and eradicating invasive exotic species.

6. Eglin AFB would continue to monitor the flatwoods salamander population through a research work order with Virginia Tech. University or other appropriate contractors.

Red-cockaded woodpecker

Work toward the long term recovery objective, as specified in the INRMP, of reaching a total of 450 potential breeding pairs of RCW with a significant portion of that growth away from current test ranges. Having a buffer of 100 groups above the recovery goal should reduce the conservation significance and importance of individual clusters being impacted by mission activities.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION NOTICE

This concludes formal consultation on the action outlined in this biological opinion. As provided in 50 CFR 402.16, Reinitation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion, or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending Reinitation.

An annual report would be submitted to the Service that identifies the conservation measures that were employed and the actions taken to implement the terms and conditions for each ARG/MEU exercise that was conducted. This report should include the dates and timing of activities, an

assessment of the effectiveness of the conservation measures and terms and conditions, and a plan of action to address impacts to habitats resulting from ARG/MEU activities. The annual report would be submitted no later than 60 days after each year the ARG/MEU Training is conducted. Failure to implement the conservation measures, terms and conditions, or failure to provide an annual report, would result in reinitation of consultation

The above findings and recommendations constitute the report of the Department of the Interior. This concludes formal consultation on the U.S. Marine Corps Expeditionary Unit Training at Eglin Air Force Base. If you have any questions about this opinion or consultation, please contact staff ecologist Stan Simpkins of our Panama City Field Office at (850) 769-0552, extension 234.

PCFO:SSimpkins:sks:03-31-03:850-769-0552:c\stan\EGLINBO~1..wpd

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APPENDIX M

NMFS BIOLOGICAL OPINION

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
9721 Executive Center Drive North
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F/SER3:BH

Mr. Richard W. McWhite
Chief, Natural Resources Branch
AAC/EMSN
501 De Leon Street, Suite 101
Eglin AFB, FL 32542-5133

Dear Mr. McWhite:

This letter is in reference to your letter dated March 6, 2003, and the draft environmental assessment and draft biological assessment dated March 7, 2003, regarding the proposed use of Eglin Air Force Base (AFB) and the air space and waters surrounding it for the United States Marines' and United States Navy's Amphibious Ready Group/Marine Expeditionary Unit (ARG/MEU) readiness training. The training of marines and sailors is anticipated to occur twice per year with each training event having a total duration of 10 days, or less if only a portion of the activities are conducted. It is possible that the training could only occur once during some years and possibly not at all in others.

This training would involve the following elements:

Amphibious landings: This is the ship-to-shore movement of landing crafts (landing craft air cushion [LCAC] and landing craft utility [LCU]), amphibious assault vehicles (AAV), and small boats (Zodiacs). The landing crafts are used to transport all non-amphibious vehicles along with other equipment and ground forces.

Ground movement: Movement of tracked and wheeled vehicles and troops on foot from landing sites to objective areas, from objective area to objective area, and from objective areas back to amphibious shipping (during withdrawal).

Aviation operations: Delivery of troops and equipment from ship to shore via a variety of helicopters that would land at designated landing zones scattered throughout the Eglin reservation and may include a fixed-wing escort. Aviation operations also occur during live fire exercises and can include weapons delivery from F/A-18 and AV-8B aircraft.

Munitions use: Live fire from ground-based troops and vehicles as well as air delivery of larger munitions. This also includes the use of blank munitions during raids.

Pyrotechnics use: Raids on objective sites with opposing forces acting as resistance involving the use of pyrotechnics (smokes and flares). Additionally, the AAVs may deploy smoke when traveling from ship to shore.

Ship Operations: Transport of the MEU to be conducted by the Navy Amphibious Ready Group (ARG) which consists of 3 amphibious ships and 2 to 3 cruisers/destroyers. Transport would occur from an inner transport area, which is essentially a 5- by 20-mile rectangular box approximately 1 to 6 nautical miles offshore. During the 10-day exercise, ARG ships will normally remain within the inner transport area at slow speed (5 to 10 knots). The ARG ships will be involved in the launch and recovery of aircraft and amphibious vessels.

The aquatic environments that are part of the action area and that will be utilized during these exercises include the Gulf of Mexico, the Yellow River, the East Bay River, Choctawhatchee Bay, and Santa Rosa Sound. The following species and designated critical habitat protected by the Endangered Species Act (ESA) and under the National Marine Fisheries Service's (NOAA Fisheries) purview can be found in or near the action area: five species of sea turtles (loggerhead, green, Kemp's ridley, leatherback, and hawksbill), Gulf sturgeon, smalltooth sawfish, sperm whales, and Gulf sturgeon critical habitat.

NOAA Fisheries has determined that air and land operations are not likely to adversely affect ESA-listed species under NOAA Fisheries' purview. The only proposed activities that may affect ESA-listed species and critical habitat under NOAA Fisheries' purview are the use of the AAVs, LCACs, LCUs and other vessel operations (the use of live munitions will take place only on land). Sperm whales are not expected to be in the shallow near shore waters of the action area (all vessel activities are expected to take place between 1 and 6 nautical miles from shore) and, therefore, will not be affected by the proposed action. NOAA Fisheries has jurisdiction over Gulf sturgeon when they are in the Gulf of Mexico and estuaries; the United States Fish and Wildlife Service (FWS) has jurisdiction over them when they are in the rivers. While in the Gulf of Mexico and estuaries, Gulf sturgeon spend the majority of their time at or near the bottom (they feed on invertebrates in the substrate); therefore, the effects of the use of LCACs and Zodiacs, which have a shallow draft, on Gulf sturgeon are expected to be insignificant. As with Gulf sturgeon, smalltooth sawfish spend the majority of their time at or near the bottom so the effects of the use of shallow draft LCACs and Zodiacs on smalltooth sawfish are also expected to be insignificant. The AAVs and LCUs are tracked amphibious vehicles and move slowly. The tracks do not hit the substrate until they get near the beach in very shallow water. Sawfish and sturgeon are very mobile and will be able to avoid these vessels; therefore, the effects of the use of AAVs and LCUs on Gulf sturgeon and smalltooth sawfish are expected to be insignificant. Based on this information, NOAA Fisheries believes that the proposed action is not likely to adversely affect sperm whales, Gulf sturgeon in areas under NOAA Fisheries' purview, and smalltooth sawfish.

Designated Gulf sturgeon critical habitat under NOAA Fisheries' purview can be found in Santa Rosa Sound, Choctawhatchee Bay, and areas of the Gulf of Mexico (areas of the Yellow River are also designated as critical habitat; however, they are under FWS purview). The primary constituent elements that make these areas essential for the conservation and recovery of Gulf sturgeon include: abundant prey items, good water quality (including temperature, salinity, pH, hardness, turbidity, oxygen content, and other chemical characteristics necessary for normal behavior, growth, and viability of all life stages), sediment quality (including texture and other chemical characteristics necessary for normal behavior, growth, and viability of all life stages) and safe, unobstructed migratory pathways. The effects of twice-a-year amphibious operations in these areas may cause temporary increases in turbidity and may temporarily displace prey

items from the top benthic layer in the small areas used by tracked vehicles, but it is unlikely to cause a detectable reduction in the abundance of prey items in the action area. Other aspects of water quality (temperature, pH, hardness, salinity, and oxygen content) and sediment quality (texture and important chemical characteristics) will not be affected by the proposed action. The proposed action is also not expected to block migratory pathways. Vessels will pass through but will not remain in critical habitat areas; therefore, migration through the area will not be hindered. Therefore, NOAA Fisheries believes that the proposed action's effects on designated Gulf sturgeon critical habitat under NOAA Fisheries' purview will be insignificant.

Three species of sea turtles (loggerhead, green, and leatherback) have been recorded nesting on and near the action area (the effects of the proposed action on nesting females, turtle nests, and hatchlings while on the beach will be analyzed by the FWS). Eglin AFB proposed two mitigative measures to minimize the chance of adversely affecting sea turtles; the first is for the operations to avoid drifting *Sargassum* and the second is to relocate nests in the action area to areas outside the action area (under permits and terms and conditions of an incidental take statement that are expected to be issued by the FWS). NOAA Fisheries believes that the relocation of nests to areas outside the action area will reduce the chances of the proposed action affecting hatchling turtles while in the water to discountable levels. Using GulfCet II surveys, Eglin AFB determined the density of non-hatchling turtles expected to be at the surface in the vessel transit area being used by the various amphibious vessels (about 70 square miles and, therefore, vulnerable to a boat strike) to be about five turtles at any given time. LCUs and AAVs are slow moving, and LCACs are extremely loud and can be heard from a long distance, making it easy and likely that highly mobile sea turtles will avoid the areas where these vessels are being used. Based on the relatively low density of sea turtles at the surface in the vessel transit area and the high mobility of sea turtles, NOAA Fisheries believes the proposed action's effects on sea turtles will be insignificant. Therefore, NOAA Fisheries believes that the proposed action is not likely to adversely affect species or critical habitat protected by the ESA under NOAA Fisheries' purview.

This concludes the Air Force's consultation responsibilities under section 7 of the ESA for the proposed project. A new consultation must be initiated if a take occurs or new information reveals effects of the action not previously considered, or the identified action is subsequently modified in a manner that causes an effect to listed species or critical habitat in a manner or to an extent not previously considered, or if a new species is listed or critical habitat designated that may be affected by the identified action.

Incidental takes of marine mammals (listed or non-listed) are not authorized through the ESA section 7 process. If such takes may occur, an incidental take authorization under Marine Mammal Protection Act (MMPA) Section 101 (a)(5) is necessary. For more information regarding MMPA permitting procedures, contact Ken Hollingshead of our Headquarters' Protected Resources staff at (301) 713-2323.

Pursuant to the essential fish habitat consultation requirements of the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1855(b)(2) and 50 CFR 600.905-.930, Subpart K), the NOAA Fisheries' Habitat Conservation Division (HCD) is being copied with this letter. If you have any questions about consultation regarding essential fish habitat for this project, please contact Mr. Mark Thompson at (850) 234-5061.

If you have any questions about this ESA section 7 consultation, please contact Mr. Robert Hoffman, fishery biologist, at the number listed above.

Sincerely,

Roy E. Crabtree, Ph.D.
Regional Administrator

cc: F/PR; F/SER45 - Mark Thompson
o:\section7\informal\amphibious.wpd
File: 1514-22.s.USAF

APPENDIX N

AGENCY COORDINATION

SAIC

Department of Environmental Protection

Jeb Bush
Governor

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

David B. Struhs
Secretary

January 10, 2003

Dr. Paul Bolduc
AAC/EMSP
501 De Leon, Suite 101
Eglin AFB, Florida 32542-5133

RE: U.S. Department of Defense - Eglin Military Complex/Air Armament Center - U.S. Marine Corps Training Support - Description of Proposed Action and Alternatives - Eglin Air Force Base, Okaloosa County, Florida
SAI: FL200212303262

Dear Dr. Bolduc:

The Florida State Clearinghouse has coordinated the review of the above-referenced document. Comments provided by our reviewing agencies are summarized below and enclosed for your consideration in preparing the referenced Environmental Assessment (EA).

The Florida Fish and Wildlife Conservation Commission (FWC) indicates that Eglin Air Force Base and its adjacent nearshore waters support diverse fish and wildlife communities, including several listed species. The EA should include a thorough evaluation of potential impacts to listed species. Listed shore birds and sea turtles are most likely to be impacted by military activities on Santa Rosa Island, especially during spring and summer nesting seasons. The FWC recommends scheduling operations during non-nesting seasons. Compliance with the U.S. Fish and Wildlife Service guidelines for sea turtles would minimize potential adverse impacts. If military operations are expected to impact listed species, then consultation with FWC will be required. Please refer to the enclosed FWC comments for details.

The Northwest Florida Water Management District (NWFWMD) indicates that natural habitats on Santa Rosa Island and elsewhere on Eglin Air Force Base provide protection for water resources and support diverse terrestrial and aquatic ecosystems and other environmental resources. The NWFWMD recommends that Eglin identify specific habitats and resources that are important and include measures for protecting these areas. Please refer to the enclosed NWFWMD comments for further details.

The Department of Environmental Protection (Department) notes that the types of exercises proposed are likely to result significant impacts along specific landing sites, with minor impacts throughout the training area. These types of activities may require post exercise assessment and repair or mitigation. If exercises are conducted frequently, mitigating dune damage may be difficult and that complete loss of dune function and dune blowouts needs to be avoided. It is recommended that dune damage and blowouts be mitigated though restoration activities with sufficient time to rejuvenate, and that access to sensitive areas which are slow to recover be restricted. Identification and evaluation of measures considered for avoiding, minimizing and mitigating impacts to the dunes, water quality and habitats is needed.

Beach landings fronting the Gulf of Mexico that will occur on Eglin property will not require a joint coastal permit from the Department. However, construction of targets, access facilities or other

impacts in nearshore waters, Santa Rosa Sound and/or wetland areas may require permits from the Department's Northwest District Office in Pensacola.

The scheduling of exercises during October to December and May to July have the potential to effect the marine turtle nesting activity which generally runs from May through October. In addition, activities may interfere with beach mice and shorebird nesting, resting, and foraging. Therefore, close coordination with the both the U.S. Fish and Wildlife Service and the Florida Fish and Wildlife Conservation Commission (FWC), Bureau of Protected Species Management regarding the protection of sea turtles and beach mice is advised. In order to address any marine turtle protection requirements, early initiation of the Endangered Species Act consultation is recommended.

The Florida Department of Transportation (DOT) is the state agency responsible for safety on State Roads 20 and 30 (US 98) in Okaloosa County. The DOT offers its assistance in communicating with the public by erecting and dismantling signs to provide notifications of road closures as need by military operations. The military is advised to notify DOT regarding when and where signs are needed prior to the start of operations. Contact information needed by DOT for notification includes contact name(s), how they wish to make contact (such as telephone and cell phone numbers, e-mail addresses, etc.), and when such notifications are anticipated to be made. Please refer to the enclosed DOT comments for details.

The Florida Highway Patrol (FHP) requests that the FHP Troop Commander for the area, Major Randall M. Brown, be notified at the beginning of training activities. Major Brown's telephone number is (850) 872-4150, extension 238. He will notify FHP personnel that training is being conducted, and temporary road closures are possible. Please refer to the enclosed FHP comments.

The EA should include a thorough analysis of the alternative actions regarding potential damage to dune vegetation; potential impacts to listed species, freshwater and saltmarsh ecosystems, and water quality; measures for storing, handling and retrieving hazardous materials; and plans for mitigation of impacts.

The draft EA and all subsequent environmental documents prepared for this project must be submitted to the State Clearinghouse for review to determine the project's consistency with the Florida Coastal Management Program (FCMP). The state's consistency concurrence with the project will be based, in part, on the adequate resolution of issues identified during this and subsequent reviews.

Thank you for the opportunity to review this project. If you have any questions regarding this letter, please contact Ms. Rosalyn Kilcollins at (850) 245-2161.

Sincerely,

Sally B. Mann

Sally B. Mann, Director
Office of Intergovernmental Programs

SBM/rk
Enclosures
cc: Duncan Cairns, NWFWMD
Brian Barnett, FWC
Jimmey Bailey, DOT
Colonel Chris Knight, FHP

FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

KENNETH D. HADDAD, Executive Director
VICTOR J. HELLER, Assistant Executive Director

BRIAN S. BARNETT, INTERIM DIRECTOR
OFFICE OF ENVIRONMENTAL SERVICES
(850)488-6661 TDD (850)488-9542
FAX (850)922-5679

January 8, 2003

Ms. Cindy Cranick
Florida Coastal Management Program
Department of Environmental Protection
3900 Commonwealth Boulevard, Douglas Bldg.
Tallahassee, FL 32399-3000

RE: SAI FL200212303262, U.S. Air Force – Draft Proposed Action and Alternatives for U.S. Marine Corps Training Support RCS-1137 at Eglin Air Force Base, Okaloosa County

Dear Ms. Cranick:

The Office of Environmental Services of the Florida Fish and Wildlife Conservation Commission has reviewed the proposed actions and alternatives to be addressed in the draft Environmental Assessment for the planned Marines training support, and offers the following comments.

The notice discussed the various actions and alternatives associated with the proposed training operations. The proposed training activities would potentially utilize Santa Rosa Island, mainland Eglin Air Force Base (AFB), outlying fields, and adjacent estuarine and riverine areas.

Eglin AFB and its adjacent nearshore waters support diverse fish and wildlife communities, including a number of state and federal listed species. Listed species that could be particularly impacted by military activities on Santa Rosa Island are sea turtles and shore birds, including the least tern, snowy plover, and black skimmer. Impacts to these species would be most likely during their spring and summer nesting seasons. Scheduling operations to non-nesting seasons, and complying with U.S. Fish and Wildlife Service guidelines for sea turtles would minimize adverse impacts to these species. Many other state and federally listed species occur within the mainland portion of Eglin AFB. The proposed draft Environmental Assessment that will be prepared for the training activities should include a comprehensive evaluation of potential impacts to listed species. If the proposed training activities are expected to impact listed species under our jurisdiction, consultation should be initiated with our agency to address and resolve listed species concerns.

620 South Meridian Street • Tallahassee • FL • 32399-1600
www.floridaconservation.org

We appreciate the opportunity to comment on the scope of issues and alternatives provided. Please contact me if you have any questions regarding this correspondence.

Sincerely,

Brian Barnett

Brian S. Barnett, Interim Director
Office of Environmental Services

BSB/RDM
ENV 1-3-2
eglinmar tra
cc: Ms. Karen Lamonte, FWC, Panama City
Ms. Lorna Patrick, USFWS, Panama City
Ms. Robbin Trindell, OES-BPS

BK

NORTHWEST FLORIDA WATER MANAGEMENT DISTRICT
Project Review Form

TO: **State Clearinghouse**
Department of Environmental Protection
3900 Commonwealth Boulevard, MS 47
Tallahassee, FL 32399-3000

DATE: **January 6, 2003**

SUBJECT: Project Review: **Intergovernmental Coordination**
Title: **Department of the Air Force-Scoping Notice-Draft Description of Proposed Action and Alternatives (DOPAA) for U.S. Marine Corps Training Support-RCS-1137-Okaloosa County, FL**
SAI #: **FL200212303262**

The District has reviewed the subject application and attachments in accordance with its responsibilities and authority under the provisions of Chapter 373, Florida Statutes. As a result review, the District has the following responses:

ACTION

____ No Comment.

____ Supports the project.

____ Objects to the project; explanation attached.

____ Has no objection to the project; explanation optional.

___ Cannot evaluate the project; explanation attached.

____ Project requires a permit from the District under____.

DEGREE OF REVIEW

__x__ Documentation was reviewed.

____ Field investigation was performed.

____ Discussed and/or contacted appropriate office about project.

____ Additional documentation/research is required.

__x__ Comments attached.

SIGNED Maria Culbertson

Duncan Jay Cairns
Chief, Bur. Env. & Res. Plng.

RECEIVED
JAN 07 2003
OIP/OLGA

NORTHWEST FLORIDA WATER MANAGEMENT DISTRICT

MEMORANDUM

TO: Duncan Cairns, Chief, Bureau of Environmental Management and Planning

FROM: Paul Thorpe, Associate Water Resource Planner

DATE: January 6, 2003

SUBJECT: Scoping Notice – Draft DOPAA for USMC Training Support, Okaloosa County, Florida; SAI# FL200212303262

Eglin Air Force Base (AFB) has provided a Draft Description of Proposed Action and Alternatives (DOPAA) to provide for U.S. Marine Corps training at Eglin AFB. Site specific details on proposed activities were not provided, and the time allowed for review was constrained. It was therefore not feasible to prepare a detailed evaluation of the Draft DOPAA.

In general, however, it is noted that natural habitats on Santa Rosa Island and elsewhere on the Eglin AFB reservation both protect water resources by limiting nonpoint sources of pollution and help sustain aquatic and terrestrial habitats that are diminished or threatened elsewhere in the Florida Panhandle. It is therefore recommended that the Air Force identify and protect specific habitat types that are valuable, scarce, or distinctly protected by the Eglin AFB military reservation. Examples include Gulf coastal upland habitats, undeveloped estuarine embayments, nearshore seagrass communities, and intact estuarine riparian habitats. Please refer to District comments previously submitted in response to the Scoping Notice for Santa Rosa Island Mission Utilization Plan, SAI # FL200211253106C (District memorandum dated December 10, 2002).

District staff appreciate the opportunity to review the DOPAA. If amplification of the above recommendations or other information would be desired, please contact Paul Thorpe at (850) 539-5999 or Paul.Thorpe@nwfwmd.state.fl.us.

:OUNTY: OKALOOSA

/lessage:

DATE: 12/26/02
COMMENTS DUE DATE: 1/29/03
CLEARANCE DUE DATE: 2/24/03
SAI#: FL200212303262

STATE AGENCIES	WATER MNGMNT. DISTRICTS	OPB POLICY UNITS
COMMUNITY AFFAIRS FISH and WILDLIFE COMMISSION STATE TRANSPORTATION ENVIRONMENTAL PROTECTION	X NORTHWEST FLORIDA WMD	ENVIRONMENTAL POLICY UNIT

he attached document requires a Coastal Zone Management Act/Florida oastal Management Program consistency evalutation and is categorized s one of the following:

__ Federal Assistance to State or Local Government (15 CFR 930, Subpart F). Agencies are required to evaluate the consistency of the activity.

X Direct Federal Activity (15 CFR 930, Subpart C). Federal Agencies are required to furnish a consistency determination for the State's concurrence or objection.

__ Outer Continental Shelf Exploration, Development or Production Activities (15 CFR 930, Subpart E). Operators are required to provide a consistency certification for state concurrence/objection.

__ Federal Licensing or Permitting Activity (15 CFR 930, Subpart D). Such projects will only be evaluated for consistency when there is not an analogous state license or permit.

Project Description:

Department of the Air Force - Scoping Notice - Draft Description of Proposed Action and Alternatives (DOPAA) for U.S. Marine Corps Training Support - RCS-1137 - Okaloosa County, Florida.

To: Florida State Clearinghouse

AGENCY CONTACT AND COORDINATOR (SCH)
2555 SHUMARD OAK BLVD
TALLAHASSEE, FLORIDA 32399-2100
(850) 414-6580 (SC 994-6580)
(850) 414-0479

EO. 12372/NEPA

- ☐ No Comment
- ☐ Comment Attached
- ☐ Not Applicable

Federal Consistency

- ☐ No Comment/Consistent
- ☐ Consistent/Comments Attached
- ☐ Inconsistent/Comments Attached
- ☐ Not Applicable

From: NWFWMD

Division/Bureau: Resource Management Div.

Reviewer: Duncan J. Cairns
Date________

Date: ________

Florida Department of

Memorandum **Environmental Protection**

TO: **Florida State Clearinghouse**

ms

FROM: **Rosalyn Kilcollins, Environmental Specialist**
Office of Intergovernmental Programs

DATE: **January 6, 2003**

SAI#: **FL200212303262 - U.S. Air Force - Scoping Notice for Preparation of Draft Environmental Assessment - Draft Proposed Action and Alternatives for U.S. Marine Corps Training Support - Eglin Air Force Base - Okaloosa County**

The Department of Environmental Protection (Department) has reviewed the above referenced document and offers the following comments and recommendations for your consideration.

The environmental assessment of the alternative actions should include evaluation of the potential for damage to dune vegetation, impacts to freshwater and saltmarsh ecosystems and water quality, measures for handling and retrieving hazardous materials, potential effects on marine turtle nesting activity and plans for mitigation of impacts.

If exercises are conducted twice a year, mitigating dune damage may be difficult due to the frequency of occurrence. The types of exercises proposed are likely to result significant impacts along specific landing sites, with minor impacts throughout the training area. Minor impacts (foot traffic, light vehicle traffic, boat storage, etc.) are routinely self-repairing. Heavy impacts will include AAV access sites, clearing activities (earthmoving equipment), and tank/mechanized artillery (tracked vehicles). These types of activities may require post exercise assessment and repair or mitigation. If possible, the Marines may have some flexibility in choosing paths that will minimize impacts to the dunes. With the proposed frequency of exercises, managing the impacts will be necessary. The most significant impact to avoid will be complete loss of dune function that results from dune blowouts. It is advised that all dune blowouts be repaired with compatible sand and planted with sea oats to help stabilize the dune. It may also be appropriate to limit access to certain areas that are slow to recover.

The functional dunes can be reasonably mitigated through restoration activities as long as they are given sufficient time (more than 6 months) to rejuvenate. Since this may be an ongoing activity, it might be worthwhile for Eglin to set up a greenhouse/nursery to propagate sea oats and other dune vegetation. If a nursery is established, once post-exercise damage is determined, the appropriate dune re-building and revegetation could be done almost immediately. If the area is repeatedly used for exercises, recovery will never be permanent and completed, but at least habitat damage and beach vulnerability can be reduced. In addition, post exercise cleanup of the training area will need to be accomplished to include removal of brass, and other non-biodegradable items.

The Department's Northwest District has worked on some dune revegetation propagation and restoration, and in partnership with Eglin, would be glad to help with this. The Department suggests that consideration also be given to revegetation of freshwater and saltmarsh ecosystems that are impacted. Assistance could be provided by the Jackson Guard at Eglin, which currently works with The Nature Conservancy and other groups to do revegetation around streams and critical wetland habitat for threatened and endangered species.

The schedule of two exercises per year during October to December and May to July have the potential to affect the marine turtle nesting activity which generally runs from May through October. In addition, activities that may interfere with beach mice and shorebird nesting, resting, and foraging are of concern. Therefore, close coordination with the both the U.S. Fish and Wildlife Service and the Florida Fish and Wildlife Conservation Commission (FWC), Bureau of Protected Species Management is advised regarding these issues. Some measures that could be considered for the protection of sea turtles and beach mice may include:

- Turtle nest monitoring and marking
- Avoidance protocol;
- Nest relocation out of the area;
- Regrading the beach as soon as possible to eliminate significant ruts for subsequent nesting activity; and
- Beach mouse surveys and potential trapping and relocation before each exercise.

The schedule of activities in the Environmental Documentation Schedule indicates initiation of the Endangered Species Act consultation in May, 2003. This may pose significant problems if exercises are planned to commence this summer. Since nest surveys and relocation would need to begin as early as May 1, 2003, the Department suggests that the consultation start earlier in order to address any marine turtle protection requirements prior to May 1, 2003.

The Department advises that the proposed beach landings fronting the Gulf of Mexico are specifically exempt from permitting pursuant to 62B-33, F.A.C., which reads:

62B-33.004
(3) In addition to the exemptions provided in Section 161.053(12), Florida Statutes, the following are exempt from the provisions of Section 161.053, Florida Statutes, and this chapter:
(b) Construction, excavation, and damage or destruction of vegetation conducted by the United States Government on lands owned and maintained by the United States Government.

Since most of the proposed beach landings will occur on Eglin property, there is no requirement to obtain a joint coastal permit from the Department. However, construction of targets or access facilities in wetland or nearshore water areas may require permits from the Department's Northwest District Office in Pensacola. The proposed use of non-lead munitions is encouraged. Eglin is advised to contact Mr. Eric Schneider or Ms. Kathleen Jones at (850) 595-8300 regarding permitting requirements.

Thank you for the opportunity to review and comment on this document. Please feel free to call me at (850) 245-2161 if you have any other questions or need additional information.

cc: Dick Fancher, DEP Northwest District
Michael Sole, DEP Beaches and Wetland Systems
Mollie Palmer, DEP, Office of Chief of Staff

/rfk

INTY: OKALOOSA

sage:

DATE: 12/26/02
COMMENTS DUE DATE: 1/29/03
CLEARANCE DUE DATE: 2/24/03
SAI#: FL200212303262

STATE AGENCIES	WATER MNGMNT. DISTRICTS	OPB POLICY UNITS
COMMUNITY AFFAIRS FISH and WILDLIFE COMMISSION STATE TRANSPORTATION ENVIRONMENTAL PROTECTION	NORTHWEST FLORIDA WMD	ENVIRONMENTAL POLICY UNIT

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JAN 3 2003
DEPT. OF COMM. AFFAIRS/DCP

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Federal Licensing or Permitting Activity (15 CFR 930, Subpart D). Such projects will only be evaluated for consistency when there is not an analogous state license or permit.

Project Description:

Department of the Air Force - Scoping Notice - Draft Description of Proposed Action and Alternatives (DOPAA) for U.S. Marine Corps Training Support - RCS-1137 - Okaloosa County, Florida.

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JAN 0 9 2003
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o: Florida State Clearinghouse
AGENCY CONTACT AND COORDINATOR (SCH)
2555 SHUMARD OAK BLVD
TALLAHASSEE, FLORIDA 32399-2100
(850) 414-6580 (SC 994-6580)
(850) 414-0479

EO. 12372/NEPA

- [x] No Comment
- [ ] Comment Attached
- [ ] Not Applicable

Federal Consistency

- [ ] No Comment/Consistent
- [ ] Consistent/Comments Attached
- [ ] Inconsistent/Comments Attached
- [ ] Not Applicable

rom:
Division/Bureau: DCA/DCP
Reviewer:
Date: 1/06/03

02-3262

Rosalyn,
No comments from DOS at this point in the environmental process. Eglin and we know that this project is located on top of an archaeological site and Eglin knows it too. They will be conducting archaeological excavations to mitigate anticipated significant impacts to the site. It is addressed in the DOPAA provided.
We will comment on the environmental document(s) themselves.
We have been assured all will be properly taken care of.

Laura A. Kammerer
Historic Preservationist Supervisor
(850) 245-6333 Fax (850) 245-6437

Kilcollins, Rosalyn

From: Chris Knight [Knight.Chris@hsmv.state.fl.us]
Sent: Tuesday, January 07, 2003 4:44 PM
To: Kilcollins, Rosalyn; Brown.Randy@fhp.hsmv.state.fl.us
Subject: Military Training Plans

Ms. Kilcollins:

Our agency has reviewed the training operational plans for both the Santa Rosa Island Mission Utilization Plan and the Marine Corps Training at Elgin Air Force Base. The plans have been forwarded to the FHP Troop Commander for that area, Major Randall M. Brown. Our request is that at the beginning of training, Major Brown be notified. His telephone number is (850) 872-4150, extension 238. He can then notify our personnel in those areas that the training is being conducted, and of the possible temporary road closures.

If additional information is needed, please call.

Colonel Christopher A. Knight
Director
Florida Highway Patrol
850-488-4885
fax: 850-922-0148
www.fhp.state.fl.us

The Florida Department of Transportation (DOT) is the agency responsible for safety on State Roads 20 and 30 (US 98) in Okaloosa County. We offer our assistance in communicating with the public by erecting and dismantling signs providing notifications of road closures as need by military operations. We only need notifications as to when and where to erect these signs.

We will designate individuals to be on call to provide these services upon notification from the military. We need to know whom will be contacting our personnel, how they wish to make such contact (telephone, cell phone, e-mails, etc.), and when we can expect such contacts. We will provide State of Florida vehicles for transport of personnel and signs. Please contact tommie.speights@dot.state.fl.us, telephone number 850/638-0250 extension 208, cell phone number is 850-638-6430, or toll free (in office only) 888-638-0250 ext. 208.

I am also trying to arrange for contacts in DeFuniak Springs, Crestview, or Fort Walton Beach. I am working on this and will e-mail the information to Eglin as soon as it is set so you can communicate to your field personnel. Unless arrangements are made, DOT's normal working hours are 7:00 to 4:00 CST, Monday through Friday. It is anticipated that training will also occur outside those hours so DOT needs advance notification as possible to assure appropriate personnel are on hand.

Please communicate back to Virgie.Bowen@dot.state.fl.us for further coordination. She will coordinate with other personnel in the District as needed so we may all bring this Training Effort to a successful conclusion.

Jimmey Bailey
District Environmental Management Administrator/
Contamination Impacts Coordinator
FAX: 850/638-6368
e-mail: jimmey.bailey@dot.state.fl.us

Department of
Environmental Protection

Jeb Bush
Governor

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

David B. Struhs
Secretary

March 25, 2003

Mr. James D. Sirmans
Director, Environmental Management
501 De Leon, Suite 101
Eglin AFB, Florida 32542-5133

RE: U.S. Department of Defense - Draft Environmental Assessment and Draft Finding of No Significant Impacts - Amphibious Ready Group/Marine Expeditionary Unit Readiness Training - Eglin Air Force Base, Okaloosa, Santa Rosa and Walton Counties, Florida
SAI: FL200303101106C

Dear Mr. Sirmans:

The Florida State Clearinghouse, pursuant to Presidential Executive Order 12372, Gubernatorial Executive Order 95-359, the Coastal Zone Management Act, 16 U.S.C. §§ 1451-1464, as amended, and the National Environmental Policy Act, 42 U.S.C. §§ 4321, 4331-4335, 4341-4347, as amended, has coordinated the review of the above-referenced Draft Environmental Assessment (EA). The applicant and related Department of Defense agencies will be hereafter collectively referred to as Eglin.

The U.S. Marines and U.S. Navy propose to conduct various training activities at a maximum frequency of twice per year for up to ten days each at Eglin Air Force Base. Locations of the proposed training activities include Santa Rosa Island, East Bay Point, White Point, Alaqua Point, Hammock Point, Wynnhaven Beach, Yellow River, Santa Rosa Sound, East Bay, Choctawhatchee Bay and nearshore waters of the Gulf of Mexico.

The Florida Fish and Wildlife Conservation Commission (FWC) notes that the EA includes an evaluation of potential impacts of the proposed military activities to listed species. Several state-listed species were omitted from the sensitive species evaluation, however, including the southeastern Kestrel, which is state-listed as "threatened", and the Sherman's fox squirrel, pine barrens treefrog, white ibis, little blue heron, snowy egret, tri-colored heron and gopher frog, which are listed as "species of special concern." The FWC indicates that further evaluation of potential impacts to those particular species, as well as consultation with the FWC regarding all state-listed species, will be required to ensure that possible impacts to state-listed species are adequately addressed. Please refer to the enclosed FWC comments for details.

The Northwest Florida Water Management District (NWFWMD) indicates that frequent disturbance and long-term alteration could impact shoreline and riparian natural habitats, dunes, wetlands, water quality and possibly aquatic and seagrass habitat on and adjacent to Santa Rosa Island,

East Bay Point, White Point, Alaqua Point and Wynnhaven Beach. Identification of potential impacts to these resources is recommended. Specific mitigation actions, such as restoration and/or acquisition of similar undeveloped habitats, should be considered as compensation for long-term and recurring impacts. To provide protection for water resources and to support diverse ecosystems and other environmental resources, NWFWMD recommends that Eglin identify important aquatic and terrestrial habitats and resources and include measures for protecting the areas. Please refer to the enclosed NWFWMD comments for further details.

The Department of Environmental Protection (DEP) indicates that the proposed activities will likely require permits from DEP's Northwest District for wetland impacts and stormwater management. Eglin is advised that additional information will be needed during permit application review, such as detailed descriptions and impact evaluations of the proposed activities identified in the enclosure. Detailed drawings and maps that identify wetland impacts and delineated wetland areas will also be needed. The proposed beach landing areas fronting the Gulf of Mexico are specifically exempt from permitting pursuant to Chapter 161, Florida Statutes (F.S.). Impacts from amphibious landings, movement of wheeled or tracked vehicles and troop maneuvers may, however, persist long enough to affect the behavior of native plants and animals and reduce the storm protection capacity of the system. Therefore, improved management practices that will prevent, reduce and mitigate for such impacts are recommended. Please refer to DEP's enclosed comments dated March 21, 3003, for details.

The Florida Department of Transportation (DOT) advises that coordination with the District 3 Office regarding proposed activities will prevent conflicts with DOT road projects The DOT offers its assistance to provide notifications of road closures and requests that future notices be coordinated with DOT's Public Information Director. Please refer to the enclosed DOT comments for contact information and further details.

Based on the information contained in the above-referenced draft EA and the comments provided by our reviewing agencies, as summarized above and enclosed, the state has determined that, at this stage, the proposed project is consistent with the Florida Coastal Management Program (FCMP). All subsequent environmental documents prepared for the project must be reviewed to determine the project's continued consistency with the FCMP. The state's consistency concurrence with the project will be based, in part, on the adequate resolution of issues identified during this and subsequent reviews. The state's final concurrence of the project's consistency with the FCMP will be determined during the environmental permitting stage.

Eglin is advised that although the draft EA indicates that the proposed activities are consistent with the FCMP, the evaluation does not clearly address how the proposed project would affect the twenty-three statutes that comprise the FCMP. Future projects should include a Coastal Zone Management Act federal consistency determination that addresses the project's compliance with the applicable enforceable policies included in all FCMP statutes. If a particular FCMP statute is not

applicable to the proposed project, that should be stated as well. The state agrees that the draft EA provides sufficient information for the state to evaluate the project's consistency with the FCMP at this stage of project development. The documents provided do not, however, fully address the requirements of the CZMA and 15 CFR 930, Subpart C. Future documents prepared for the project and/or other proposed activities should comply with the CZMA and 15 CFR 930.39 (copy enclosed). The DEP Office of Intergovernmental Programs is available to assist you with this requirement, if needed.

Thank you for the opportunity to review the project. Should you have any questions regarding this letter, please contact Ms. Rosalyn Kilcollins at (850) 245-2163.

Sincerely,

Sally B. Mann

Sally B. Mann, Director
Office of Intergovernmental Programs

SBM/rk

Enclosures

cc: Duncan Cairns, NWFWMD
Brian Barnett, FWC
Jimmey Bailey, DOT

activities requiring a less extensive review period, provided that public participation requirements are met.

(c) *General consistency determinations.* In cases where Federal agencies will be performing repeated activity other than a development project (*e.g.*, ongoing maintenance, waste disposal) which cumulatively has an effect upon any coastal use or resource, the Federal agency may develop a general consistency determination, thereby avoiding the necessity of issuing separate consistency determinations for each incremental action controlled by the major activity. A Federal agency may provide a State agency with a general consistency determination only in situations where the incremental actions are repetitive and do not affect any coastal use or resource when performed separately. A Federal agency and State agency may mutually agree on a general consistency determination for de minimis activities (*see* § 930.33(a)(3)) or any other repetitive activity or category of activity(ies). If a Federal agency issues a general consistency determination, it shall thereafter periodically consult with the State agency to discuss the manner in which the incremental actions are being undertaken.

(d) *Phased consistency determinations.* In cases where the Federal agency has sufficient information to determine the consistency of a proposed development project or other activity from planning to completion, the Federal agency shall provide the State agency with one consistency determination for the entire activity or development project. In cases where federal decisions related to a proposed development project or other activity will be made in phases based upon developing information that was not available at the time of the original consistency determination, with each subsequent phase subject to Federal agency discretion to implement alternative decisions based upon such information (*e.g.*, planning, siting, and design decisions), a consistency determination will be required for each major decision. In cases of phased decisionmaking, Federal agencies shall ensure that the development project or other activity continues to be consistent to the maximum extent practicable with the management program.

(e) *National or regional consistency determinations.* (1) A Federal agency may provide States with consistency determinations for Federal agency activities that are national or regional in scope (*e.g.*, rulemaking, national plans), and that affect any coastal use or resource of more than one State. Many States share common coastal management issues and have similar enforceable policies, *e.g.*, protection of a particular coastal resource. The Federal agency's national or regional consistency determination should, at a minimum, address the common denominator of these policies, *i.e.*, the common coastal effects and management issues, and thereby address different States' policies with one discussion and determination. If a Federal agency decides not to use this section, it must issue consistency determinations to each State agency pursuant to § 930.39.

(2) Federal agency activities with coastal effects shall be consistent to the maximum extent practicable with the enforceable policies of each State's management program. Thus, the Federal agency's national or regional consistency determination shall contain sections that would apply to individual States to address coastal effects and enforceable policies unique to particular States, if common coastal effects and enforceable policies cannot be addressed under paragraph (e)(1). Early coordination with coastal States will enable the Federal agency to identify particular coastal management concerns and policies. In addition, the Federal agency could address the concerns of each affected State by providing for State conditions for the proposed activity. Further, the consistency determination could identify the coordination efforts and describe how the Federal agency responded to State agency concerns.

§ 930.37 Consistency determinations and National Environmental Policy Act (NEPA) requirements

A Federal agency may use its NEPA documents as a vehicle for its consistency determination or negative determination under this subpart. However, a Federal agency's federal consistency obligations under the Act are independent of those required under NEPA and are not necessarily fulfilled by the submission of a NEPA document. If a Federal agency includes its consistency determination or negative determination in a NEPA document, the Federal agency shall ensure that the NEPA document includes the information and adheres to the timeframes required by this subpart. Federal agencies and State agencies should mutually agree on how to best coordinate the requirements of NEPA and the Act.

§ 930.38 Consistency determinations for activities initiated prior to management program approval.

(a) A consistency determination is required for ongoing Federal agency activities other than development projects initiated prior to management program approval, which are governed by statutory authority under which the Federal agency retains discretion to reassess and modify the activity. In these cases the consistency determination must be made by the Federal agency at the earliest practicable time following management program approval, and the State agency must be provided with a consistency determination no later than 120 days after management program approval for ongoing activities which the State agency lists or identifies through monitoring as subject to consistency with the management program.

(b) A consistency determination is required for major, phased federal development project decisions described in § 930.36(d) which are made following management program approval and are related to development projects initiated prior to program approval. In making these new decisions, Federal agencies shall consider effects on any coastal use or resource not fully evaluated at the outset of the project. This provision shall not apply to phased federal decisions which were specifically described, considered and approved prior to management program approval (*e.g.*, in a final environmental impact statement issued pursuant to NEPA).

§ 930.39 Content of a consistency determination.

(a) The consistency determination shall include a brief statement indicating whether the proposed activity will be undertaken in a manner consistent to the maximum extent practicable with the enforceable policies of the management program. The statement must be based upon an evaluation of the relevant enforceable policies of the management program. A description of this evaluation shall be included in the consistency determination, or provided to the State agency simultaneously with the consistency determination if the evaluation is contained in another document. Where a Federal agency is aware, prior to its submission of its consistency determination, that its activity is not fully consistent with a management program's enforceable policies, the Federal agency shall describe in its consistency determination the legal authority that prohibits full consistency as required by

§ 930.32(a)(2). Where the Federal agency is not aware of any inconsistency until after submission of its consistency determination, the Federal agency shall submit its description of the legal authority that prohibits full consistency to the State agency as soon as possible, or before the end of the 90-day period described in § 930.36(b)(1). The consistency determination shall also include a detailed description of the activity, its associated facilities, and their coastal effects, and comprehensive data and information sufficient to support the Federal agency's consistency statement. The amount of detail in the evaluation of the enforceable policies, activity description and supporting information shall be commensurate with the expected coastal effects of the activity. The Federal agency may submit the necessary information in any manner it chooses so long as the requirements of this subpart are satisfied.

(b) Federal agencies shall be guided by the following in making their consistency determinations. The activity its effects on any coastal use or resource, associated facilities (*e.g.*, proposed siting and construction of access road, connecting pipeline, support buildings, and the effects of the associated facilities (*e.g.*, erosion, wetlands, beach access impacts), must all be consistent to the maximum extent practicable with the enforceable policies of the management program.

(c) In making their consistency determinations, Federal agencies shall ensure that their activities are consistent to the maximum extent practicable with the enforceable, policies of the management program. However, Federal agencies should give consideration to management program provisions which are in the nature of recommendations.

(d) When Federal agency standards are more restrictive than standards or requirements contained in the management program, the Federal agency may continue to apply its stricter standards. In such cases the Federal agency shall inform the State agency in the consistency determination of the statutory, regulatory or other basis for the application of the stricter standards.

(e) *State permit requirements.* Federal law, other than the CZMA, may require a Federal agency to obtain a State permit. Even when Federal agencies are not required to obtain State permits, Federal agencies shall still be consistent to the maximum extent practicable with the enforceable policies that are contained in such State permit programs that are part of a management program.

§ 930.40 Multiple Federal agency participation.

Whenever more than one Federal agency is involved in a Federal agency activity or its associated facilities affecting any coastal use or resource, or is involved in a group of Federal agency activities related to each other because of their geographic proximity, the Federal agencies may prepare one consistency determination for all the federal activities involved. In such cases, Federal agencies should consider joint preparation or lead agency development of the consistency determination. In either case, the consistency determination shall be transmitted to the State agency at least 90 days before final decisions are taken by any of the participating agencies and shall comply with the requirements of § 930.39.

§ 930.41 State agency response.

(a) A State agency shall inform the Federal agency of its concurrence with or objection to the Federal agency's consistency determination at the earliest practicable time, after providing for public participation in the State agency's review of the consistency determination. The Federal agency may presume State agency concurrence if the State agency's response is not received within 60 days from receipt of the Federal agency's consistency determination and supporting information. The 60-day review period begins when the State agency receives the consistency determination and supporting information required by § 930.39(a). If the information required by § 930.39(a) is not included with the determination, the State agency shall immediately notify the Federal agency that the 60-day review period has not begun, what information required by § 930.39(a) is missing, and that the 60-day review period will begin when the missing information is received by the State agency. If a Federal agency has submitted a consistency determination and information required by § 930.39(a), then the State agency shall not assert that the 60-day review period has not begun for failure to submit information that is in addition to that required by § 930.39(a).

(b) State agency concurrence shall not be presumed in cases where the State agency, within the 60-day period, requests an extension of time to review the matter. Federal agencies shall approve one request for an extension period of 15 days or less. In considering whether a longer or additional extension period is appropriate, the Federal agency should consider the magnitude and complexity of the information contained in the consistency determination.

(c) Final Federal agency action shall not be taken sooner than 90 days from the receipt by the State agency of the consistency determination unless the State concurs or concurrence is presumed, pursuant to paragraphs (a) and (b), with the activity, or unless both the Federal agency and the State agency agree to an alternative period.

(d) *Time limits on concurrences.* A State agency cannot unilaterally place an expiration date on its concurrence. If a State agency believes that an expiration date is necessary, State and Federal agencies may agree to a time limit. If there is no agreement, later phases of, or modifications to, the activity that will have effects not evaluated at the time of the original consistency determination will require either a new consistency determination, a supplemental consistency determination under § 930.46, or a phased review under § 930.36(d) of this subpart.

(e) *State processing fees.* The Act does not require Federal agencies to pay State processing fees. State agencies shall not assess a Federal agency with a fee to process the Federal agency's consistency determination unless payment of such fees is required by other federal law or otherwise agreed to by the Federal agency and allowed by the Comptroller General of the United States. In no case may a State agency stay the consistency review period or base its objection on the failure of a Federal agency to pay a fee.

§ 930.42 Public participation.

(a) Management programs shall provide for public participation in the State agency's review of consistency determinations. Public participation, at a minimum, shall consist of public notice for the area(s) of the coastal zone likely to be affected by the activity, as determined by the State agency.

(b) *Timing of public notice.* States shall provide timely public notice after the consistency determination has been received by the State agency, except in cases where earlier public notice on the consistency determination by the Federal agency or the State agency meets the requirements of this section. A public comment period shall be provided by the State sufficient to give the public an opportunity to develop and provide comments on whether the project is consistent with management program enforceable policies and still allow the State agency to issue its concurrence or objection within the 60 day State response period.

Memorandum

Florida Department of
Environmental Protection

TO: **Florida State Clearinghouse**

FROM: **Rosalyn Kilcollins, Environmental Specialist**
Office of Intergovernmental Programs

DATE: **March 21, 2003**

SAI#: **FL200303101106C - U.S. Air Force - Draft Environmental Assessment and Draft FONSI - Amphibious Ready Group Marine Expeditionary Unit Readiness Training - Eglin Air Force Base - Okaloosa, Santa Rosa and Walton Counties**

The Department of Environmental Protection (Department) has reviewed the above-referenced documents and offers the following comments and recommendations for your consideration.

The U.S. Marines and U.S. Navy propose to conduct various training activities at a maximum frequency of twice per year for up to ten days each at Eglin Air Force Base. The proposed training activities may impact Santa Rosa Island, East Bay Point, White Point, Alaqua Point, Hammock Point, Wynnhaven Beach, Yellow River, Santa Rosa Sound, East Bay, Choctawhatchee Bay and nearshore waters of the Gulf of Mexico.

The Department's Bureau of Beaches and Wetland Systems (Bureau) has determined that proposed beach landings fronting the Gulf of Mexico are specifically exempt from permitting pursuant to Chapter 161, Florida Statutes (F.S.). However, the coastal system in this area of the state is characterized by very low wind and wave energy, in the absence of tropical storms. Impacts from amphibious landings, wheeled or tracked vehicular movement and troop movements may persist sufficiently long enough to affect the behavior of native plants and animals, and reduce the storm protection capacity of the system. Therefore, the Bureau recommends additional management practices that will prevent, reduce and mitigate for impacts. Post-mission restoration should include the removal of any debris and reconstruction of the dunes and beachfront, with specific attention to restoring natural slopes, removing any submerged or dry beach rutting, and eliminating scarps and ponding. Pre-mission topography of the beachfront along Santa Rosa Island should be surveyed to compare to post-mission surveys. The Bureau has a low altitude, slow speed video of the beachfront recorded in July, 2002, and could recommend details and possible vendors for future surveys.
In addition, revegetation of the dunes is recommended. It is advised that all dune blowouts be repaired with compatible sand and planted with sea oats to help stabilize the dune. It may also be appropriate to limit access to certain areas that are slow to recover. The establishment of a nursery is suggested to ensure the availability of native plants.

The proposed activities will likely require permits for wetland impacts and stormwater management from the Department's Northwest District. The District advises that additional

information will be required during the permit review, including detailed descriptions and evaluation of the following:

- the proposed concrete crossings for tracked vehicles;
- wetland vegetation removal
- installation of grip matting on the Soundside;
- off road vehicular traffic;
- measures proposed for preventing increased turbidity in Santa Rosa Sound;
- stormwater management and wetland impacts associated with road construction, road widening and box culverts;
- procedures for removal of ordinances and casings from wetlands; and
- justification for stream crossing instead of bridge use at East River.

More detail drawings and maps of impact areas, including wetland impacts from road construction, and delineated wetland areas should be provided. The amount of wetland impacts may require mitigation. The use of Geo-mats in lieu of gravel at the shoreline is recommended for shoreline grading. Prior to finalizing project plans, it is recommended that delineation and state verification of the landward extent of wetlands and surface waters be obtained in accordance with the guidelines of Rule 62-340, *F.A.C.* Obtaining that information at an early stage will minimize conflicts about wetland impacts generated by future construction during the permitting process. Eglin is advised to contact Mr. Eric Schneider or Ms. Kathleen Jones at (850) 595-8300 regarding permitting requirements.

Thank you for the opportunity to review and comment on this document. Please feel free to call me at (850) 245-2163 if you have any other questions or need additional information.

cc: Dick Fancher, DEP Northwest District
Michael Sole, DEP Beaches and Wetland Systems
Mollie Palmer, DEP, Office of Chief of Staff

/rfk

FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

KENNETH D. HADDAD, Executive Director
VICTOR J. HELLER, Assistant Executive Director

March 20, 2003

BRIAN S. BARNETT, INTERIM DIRECTOR
OFFICE OF ENVIRONMENTAL SERVICES
(850)488-6661 TDD (850)488-9542
FAX (850)922-5679

Ms. Lauren Milligan
Florida State Clearinghouse
Department of Environmental Protection
3900 Commonwealth Boulevard, Mail Station 47
Tallahassee, FL 32399-3000

RE: SAI FL200303101106C, U.S. Air Force – Draft Environmental Assessment (EA) and Findings of No Significant Impact (FONSI)-RCS#02-1137, Amphibious Ready Group/Marine Expeditionary Unit Readiness Training, Eglin Air Force Base, Walton, Okaloosa, and Santa Rosa Counties

Dear Ms. Milligan:

The Office of Environmental Services of the Florida Fish and Wildlife Conservation Commission has reviewed the draft Environmental Assessment (EA) and FONSI for the planned Marines readiness training, and offers the following comments.

The environmental assessment discussed the various actions and alternatives associated with the proposed training operations, and the anticipated resource impacts associated with these activities. The proposed training activities would potentially utilize Santa Rosa Island, mainland Eglin Air Force Base (AFB), outlying fields, and adjacent estuarine and riverine areas. Potential impacts to state and federally listed species were included within the EA, however a number of state-listed wildlife species were omitted from the sensitive species section of the report. Omitted species included the southeastern American kestrel (T-threatened), and the Sherman's fox squirrel, pine barrens treefrog, white ibis, little blue heron, snowy egret, and tricolored heron, all species of special concern. The gopher frog, another listed species of special concern, was mentioned in the EA discussion regarding the gopher tortoise, but was not specifically identified as being state-listed.

We previously provided comments on the draft proposed action and alternatives document for the Marines training, in a letter dated 8 January 2003 (SAI FL 200212303262), copy attached. In that letter we recommended that a comprehensive evaluation of potential impacts to federally and state-listed species be prepared, and consultation be initiated with our agency to address and resolve concerns if the proposed training activities are expected to impact

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state-listed wildlife species. The submitted draft EA sensitive species section compiled and addressed many of the potentially impacted state-listed wildlife species occurring within the training areas, however this section should be expanded to include an evaluation of impacts to the additional listed species identified earlier in this letter. Furthermore, consultations should be initiated with our agency to address and resolve any anticipated training related impacts to state-listed wildlife species.

Provided that these issues are adequately addressed in the final EA, we believe that this document should provide protection of state-listed wildlife species over which we have authority within the State's coastal zone management plan.

We appreciate the opportunity to comment on the draft EA for the proposed training exercises. Please contact either me or Mr. Rick McCann if you have any questions regarding this correspondence.

Sincerely,

Brian Barnett

Brian S. Barnett, Interim Director
Office of Environmental Services

BSB/RDM
ENV 1-3-2
eglinmar dea
Attachment
cc: Ms. Karen Lamonte, FWC, Panama City
Mr. Stan Simpkins, USFWS, Panama City
Ms. Robbin Trindell, OES-BPS

FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

BRIAN S. BARNETT, INTERIM DIRECTOR
OFFICE OF ENVIRONMENTAL SERVICES
(850)488-6661 TDD (850)488-9542
FAX (850)922-5679

January 8, 2003

Ms. Cindy Cranick
Florida Coastal Management Program
Department of Environmental Protection
3900 Commonwealth Boulevard, Douglas Bldg.
Tallahassee, FL 32399-3000

RE: SAI FL200212303262, U.S. Air Force – Draft Proposed Action and Alternatives for U.S. Marine Corps Training Support RCS-1137 at Eglin Air Force Base, Okaloosa County

Dear Ms. Cranick:

The Office of Environmental Services of the Florida Fish and Wildlife Conservation Commission has reviewed the proposed actions and alternatives to be addressed in the draft Environmental Assessment for the planned Marines training support, and offers the following comments.

The notice discussed the various actions and alternatives associated with the proposed training operations. The proposed training activities would potentially utilize Santa Rosa Island, mainland Eglin Air Force Base (AFB), outlying fields, and adjacent estuarine and riverine areas.

Eglin AFB and its adjacent nearshore waters support diverse fish and wildlife communities, including a number of state and federal listed species. Listed species that could be particularly impacted by military activities on Santa Rosa Island are sea turtles and shore birds, including the least tern, snowy plover, and black skimmer. Impacts to these species would be most likely during their spring and summer nesting seasons. Scheduling operations to non-nesting seasons, and complying with U.S. Fish and Wildlife Service guidelines for sea turtles would minimize adverse impacts to these species. Many other state and federally listed species occur within the mainland portion of Eglin AFB. The proposed draft Environmental Assessment that will be prepared for the training activities should include a comprehensive evaluation of potential impacts to listed species. If the proposed training activities are expected to impact listed species under our jurisdiction, consultation should be initiated with our agency to address and resolve listed species concerns.

We appreciate the opportunity to comment on the scope of issues and alternatives provided. Please contact me if you have any questions regarding this correspondence.

Sincerely,

Brian Barnett

Brian S. Barnett, Interim Director
Office of Environmental Services

BSB/RDM
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cc: Ms. Karen Lamonte, FWC, Panama City
Ms. Lorna Patrick, USFWS, Panama City
Ms. Robbin Trindell, OES-BPS

NORTHWEST FLORIDA WATER MANAGEMENT DISTRICT
Project Review Form

TO: **State Clearinghouse**
Department of Environmental Protection
3900 Commonwealth Boulevard, MS 47
Tallahassee, FL 32399-3000

DATE: **March 12, 2003**

SUBJECT: Project Review: **Intergovernmental Coordination**
Title: **Dept. of the Air Force-Draft Environmental Assessment and Findings of No Significant Impact (FONSIS)-RCS#02-1137, Amphibious Ready Group/Marine Expeditionary Unit Readiness Training-Eglin Air Force Base, Walton, Okaloosa, Santa Rosa County, FL**
SAI #: **FL200303101106C**

The District has reviewed the subject application and attachments in accordance with its responsibilities and authority under the provisions of Chapter 373, Florida Statutes. As a result review, the District has the following responses:

ACTION

____ No Comment.

____ Supports the project.

____ Objects to the project; explanation attached.

____ Has no objection to the project; explanation optional.

___ Cannot evaluate the project; explanation attached.

____ Project requires a permit from the District under____.

DEGREE OF REVIEW

__x__ Documentation was reviewed.

____ Field investigation was performed.

____ Discussed and/or contacted appropriate office about project.

____ Additional documentation/research is required.

__x__ Comments attached.

SIGNED Maria Culbertson
Duncan Jay Cairns
Chief, Bur. Env. & Res. Plng.

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NORTHWEST FLORIDA WATER MANAGEMENT DISTRICT

MEMORANDUM

TO: Duncan Cairns, Chief, Bureau of Environmental Management and Planning

FROM: Paul Thorpe, Associate Water Resource Planner

DATE: March 12, 2003

SUBJECT: Draft Environmental Assessment and FONSI for Amphibious Ready Group Training, Walton, Okaloosa, and Santa Rosa Counties, SAI# FL200303101106C

The U.S. Marine Corps, Department of the Navy, and U.S. Air Force have provided a Draft Environmental Assessment (EA) in support of proposed U.S. Marine Corps and Amphibious Ready Group training at Eglin AFB. Insufficient time was provided to allow a detailed or complete review of potential impacts to water and related resources of the proposed action. Initial review of the draft EA, however, indicates that frequent disturbance to and/or long-term alteration of shoreline habitats and riparian communities are planned for sites on Santa Rosa Island (Gulf of Mexico/Santa Rosa Sound), East Bay Point (East Bay), White Point (Choctawhatchee Bay), Alaqua Point (Choctawhatchee Bay), and Wynnhaven Beach (Santa Rosa Sound). Impacts will likely include degradation or loss of riparian and some wetland habitats, long-term disruption of coastal dune and other Gulf coastal habitats, sedimentation and turbidity, and possible secondary impacts on seagrasses and other aquatic habitats.

In addition to efforts to limit impacts and periodically restore affected sites, it is recommended that long-term and recurring impacts be specifically identified and that specific mitigation actions be taken to compensate for incurred impacts. This may include restoration and/or acquisition of similar undeveloped estuarine, riparian, and Gulf coastal habitats so as to provide preservation of appropriate wetland, buffer, and coastal habitat functions in perpetuity. Management could be incorporated into management of existing public conservation lands.

It is generally noted that natural habitats on Santa Rosa Island and elsewhere on the Eglin AFB reservation protect water resources by limiting nonpoint sources of pollution and help sustain aquatic and terrestrial habitats that are diminished or threatened elsewhere in the Florida Panhandle. It is therefore recommended that the Air Force continue to protect specific habitat types that are valuable, scarce, or distinctly protected by the Eglin AFB military reservation. Please refer to District comments previously submitted in response to the Scoping Notice for Santa Rosa Island Mission Utilization Plan, SAI # FL200211253106C (District memorandum dated December 10, 2002).

District staff appreciate the opportunity to review the Environmental Assessment. If amplification of the above recommendations or other information would be desired, please contact Paul Thorpe at (850) 539-5999 or Paul.Thorpe@nwfwmd.state.fl.us.

COUNTY: WALTON

DATE: 3/10/2003
COMMENTS DUE DATE: 3/18/2003
CLEARANCE DUE DATE: 3/25/2003
SAI#: FL200303101106C

MESSAGE:

STATE AGENCIES	WATER MNGMNT. DISTRICTS	OPB POLICY UNIT	RPCS & LOC GOVS
COMMUNITY AFFAIRS	NORTHWEST FLORIDA WMD X	ENVIRONMENTAL POLICY UNIT	
ENVIRONMENTAL PROTECTION			
FISH and WILDLIFE COMMISSION			
STATE			
TRANSPORTATION			

The attached document requires a Coastal Zone Management Act/Florida Coastal Management Program consistency evaluation and is categorized as one of the following:

- Federal Assistance to State or Local Government (15 CFR 930, Subpart F). Agencies are required to evaluate the consistency of the activity.
- Direct Federal Activity (15 CFR 930, Subpart C). Federal Agencies are required to furnish a consistency determination for the State's concurrence or objection.
- Outer Continental Shelf Exploration, Development or Production Activities (15 CFR 930, Subpart E). Operators are required to provide a consistency certification for state concurrence/objection.
- Federal Licensing or Permitting Activity (15 CFR 930, Subpart D). Such projects will only be evaluated for consistency when there is not an analogous state license or permit.

Project Description:

DEPARTMENT OF THE AIR FORCE - DRAFT ENVIRONMENTAL ASSESSMENT AND FINDINGS OF NO SIGNIFICANT IMPACT (FONSIS) - RCS# 02-1137, AMPHIBIOUS READY GROUP /MARINE EXPEDITIONARY UNIT READINESS TRAINING - EGLIN AIR FORCE BASE, WALTON, OKALOOSA, SANTA ROSA COUNTY, FLORIDA.

To: Florida State Clearinghouse

AGENCY CONTACT AND COORDINATOR (SCH)
3900 COMMONWEALTH BOULEVARD MS-47
TALLAHASSEE, FLORIDA 32399-3000
TELEPHONE: (850) 245-2161
FAX: (850) 245-2190

EO. 12372/NEPA

- [ ] No Comment
- [x] Comment Attached
- [ ] Not Applicable

Federal Consistency

- [ ] No Comment/Consistent
- [ ] Consistent/Comments Attached
- [ ] Inconsistent/Comments Attached
- [ ] Not Applicable

COMMENTS ATTACHED

From: NWFWMD
Division/Bureau: RESOURCE MANAGEMENT
Reviewer: DUNCAN JAY CAIRNS
Date: 12 MARCH 03

COUNTY: WALTON

DATE: 3/10/2003
COMMENTS DUE DATE: 3/18/2003
CLEARANCE DUE DATE: 3/25/2003
SAI#: FL200303101106C

MESSAGE:

STATE AGENCIES	WATER MNGMNT. DISTRICTS	OPB POLICY UNIT	RPCS & LOC GOVS
COMMUNITY AFFAIRS	NORTHWEST FLORIDA WMD	ENVIRONMENTAL POLICY UNIT	
ENVIRONMENTAL PROTECTION			
FISH and WILDLIFE COMMISSION			
STATE			
X TRANSPORTATION			

The attached document requires a Coastal Zone Management Act/Florida Coastal Management Program consistency evaluation and is categorized as one of the following:

- _ **Federal Assistance to State or Local Government (15 CFR 930, Subpart F). Agencies are required to evaluate the consistency of the activity.**
- **Direct Federal Activity (15 CFR 930, Subpart C). Federal Agencies are required to furnish a consistency determination for the State's concurrence or objection.**
- **Outer Continental Shelf Exploration, Development or Production Activities (15 CFR 930, Subpart E). Operators are required to provide a consistency certification for state concurrence/objection.**
- _ **Federal Licensing or Permitting Activity (15 CFR 930, Subpart D). Such projects will only be evaluated for consistency when there is not an analogous state license or permit.**

Project Description:

DEPARTMENT OF THE AIR FORCE - DRAFT ENVIRONMENTAL ASSESSMENT AND FINDINGS OF NO SIGNIFICANT IMPACT (FONSIS) - RCS# 02-1137, AMPHIBIOUS READY GROUP /MARINE EXPEDITIONARY UNIT READINESS TRAINING - EGLIN AIR FORCE BASE, WALTON, OKALOOSA, SANTA ROSA COUNTY, FLORIDA.

To: Florida State Clearinghouse

AGENCY CONTACT AND COORDINATOR (SCH)
3900 COMMONWEALTH BOULEVARD MS-47
TALLAHASSEE, FLORIDA 32399-3000
TELEPHONE: (850) 245-2161
FAX: (850) 245-2190

EO. 12372/NEPA

- [ ] No Comment
- [x] Comment Attached
- [ ] Not Applicable

Federal Consistency

- [ ] No Comment/Consistent
- [x] Consistent/Comments Attached
- [ ] Inconsistent/Comments Attached
- [ ] Not Applicable

From:

Division/Bureau: FDOT-3
Reviewer: Jimmy Bailey for Gene Martin
Date: 3-18-03

Florida Department of Transportation

JEB BUSH
GOVERNOR

Post Office Box 607
Chipley, Florida 32428

JOSE ABREU
SECRETARY

March 18, 2003

Ms. Cindy Cranick
Florida State Clearinghouse
3900 Commonwealth Blvd.
Tallahassee, Florida 32399

SUBJECT: Draft Environmental Assessment (EA) and Findings of No Significant (FONSIs), RCS# 02-1137, Amphibious Ready Group/Marine Expeditionary Unit Readiness Training at Eglin AFB
SAI#: FL200303101106C

Dear Ms. Cranick:

Based upon the information provided, we find the subject project to be consistent with the state transportation system. The project has been reviewed under Presidential Executive Order 12372 and the Florida Coastal Zone Management Program for consistency with the following plans and policies:

a. Florida Transportation Plan and any modal systems and work program plans directly related to this subject
b. Level of Service Standards
c. Access Management Standards
d. Right-of-Way costs and advanced acquisition
e. Intergovernmental Coordination
f. Chapters 334 and 339, Florida Statutes

Based on our review, we comments relative to this project:

The FDOT, Third District has projects (4094891, 2202461, 2201721, 4134461, 4131492, 4063271, 4061961, 2202311, 2202531, 4061961, 4090211, 4118581, 2202451, 4117021, 4112461, 4103911, 4130371, 2204021, 4073101, 2204423, 4073101, and 2204423) that **will not** conflict with this proposal if proper coordination is provided. Review of the 519-page Environmental Assessment indicates the Air Force did receive previous comments provided by this office offering to assist with roadway closures and other safety items. Given such coordination, no permits from this Department are anticipated. Please coordinate notices of future coordination with Mr. Tommie Speights; District Public Information Director, Post Office Box 607; Chipley, Florida 32428 or at telephone 850/638-0250 extension 208.

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Mr. Speights can also be reached via cell phone 850/638-6430 or toll free (in office only) 888/638-0250 ext. 208. His FAX number is 850/638-6159. Mr. Speights can also be reached by e-mail at Tommie.Speights@dot.state.fl.us.

Thank you for the opportunity to review this document and provide comments.

If you have any questions regarding this response, please contact me at (850) 638-0250.

Sincerely,

Jerry Campbell by: V.B.

Jerry Campbell
Planning Administrator

Copies: Sandra Whitmire - M.S. 28-B
Jimmey Bailey – FDOT, D3

COUNTY: WALTON

DATE: 3/10/2003
COMMENTS DUE DATE: 3/18/2003
CLEARANCE DUE DATE: 3/25/2003
SAI#: FL200303101106C

MESSAGE: 2003-2048

STATE AGENCIES	WATER MNGMNT. DISTRICTS	OPB POLICY UNIT	RPCS & LOC GOVS
COMMUNITY AFFAIRS	NORTHWEST FLORIDA WMD	ENVIRONMENTAL POLICY UNIT	
ENVIRONMENTAL PROTECTION			
FISH and WILDLIFE COMMISSION			
X STATE			
TRANSPORTATION			

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Project Description:

DEPARTMENT OF THE AIR FORCE - DRAFT ENVIRONMENTAL ASSESSMENT AND FINDINGS OF NO SIGNIFICANT IMPACT (FONSIS) - RCS# 02-1137, AMPHIBIOUS READY GROUP /MARINE EXPEDITIONARY UNIT READINESS TRAINING - EGLIN AIR FORCE BASE, WALTON, OKALOOSA, SANTA ROSA COUNTY, FLORIDA.

To: Florida State Clearinghouse

AGENCY CONTACT AND COORDINATOR (SCH)
3900 COMMONWEALTH BOULEVARD MS-47
TALLAHASSEE, FLORIDA 32399-3000
TELEPHONE: (850) 245-2161
FAX: (850) 245-2190

EO. 12372/NEPA

- [x] No Comment
- [ ] Comment Attached
- [ ] Not Applicable

Federal Consistency

- [x] No Comment/Consistent
- [ ] Consistent/Comments Attached
- [ ] Inconsistent/Comments Attached
- [ ] Not Applicable

From:

Division/Bureau: Division of Historical Resources Bureau of Historic Preservation

Reviewer: S. Edwards — Frederick P. Gaske, Deputy SHPO 3/13/03

Date: 3-13-03

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COUNTY: WALTON

DATE: 3/10/2003
COMMENTS DUE DATE: 3/18/2003
CLEARANCE DUE DATE: 3/25/2003
SAI#: FL200303101106C

MESSAGE:

STATE AGENCIES	WATER MNGMNT. DISTRICTS	OPB POLICY UNIT	RPCS & LOC GOVS
X COMMUNITY AFFAIRS	NORTHWEST FLORIDA WMD	ENVIRONMENTAL POLICY UNIT	
ENVIRONMENTAL PROTECTION			
FISH and WILDLIFE COMMISSION			
STATE			
TRANSPORTATION			

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Project Description:

DEPARTMENT OF THE AIR FORCE - DRAFT ENVIRONMENTAL ASSESSMENT AND FINDINGS OF NO SIGNIFICANT IMPACT (FONSIS) - RCS# 02-1137, AMPHIBIOUS READY GROUP /MARINE EXPEDITIONARY UNIT READINESS TRAINING - EGLIN AIR FORCE BASE, WALTON, OKALOOSA, SANTA ROSA COUNTY, FLORIDA.

To: Florida State Clearinghouse

AGENCY CONTACT AND COORDINATOR (SCH)
4050 COMMONWEALTH BOULEVARD MS-47
TALLAHASSEE, FLORIDA 32399-3000
TELEPHONE: (850) 245-2161
FAX: (850) 245-2190

EO. 12372/NEPA

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- [ ] Comment Attached
- [ ] Not Applicable

Federal Consistency

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- [ ] Consistent/Comments Attached
- [ ] Inconsistent/Comments Attached
- [ ] Not Applicable

From:

Division/Bureau: DCA/DCP
Reviewer:
Date: 3/14/03

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MAR 18 2003
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MAR 11 2003
DEPT. OF COMMUNITY AFFAIRS/DCP

WFRPC
WEST FLORIDA REGIONAL PLANNING COUNCIL

WEST FLORIDA REGIONAL PLANNING COUNCIL

Post Office Box 9759 • 3435 North 12th Avenue • Pensacola, Florida 32513-9759
Phone (850) 595-8910 • S/C 695-8910 • (800) 226-8914 • Fax (850) 595-8967

Lel Czeck
Executive Director

Cody Taylor
Chairman

Sydney Joel Pate
Vice-Chairman

FAX TRANSMITTAL (S) Total # of Pages (including cover): 1

TO: **STATE CLEARINGHOUSE ▪ FAX:** **(850) 245-2190/(850) 245-2189**
Phone: 850-245-2161

DATE: March 18, 2003

JNL

FROM: Jerrie Nelson Lewis, Intergovernmental Review Coordinator
Extension 226
lewisj@wfrpc.dst.fl.us

SUBJECT: **State Clearinghouse Review(s) Fax Transmittals:**

SAI #	Project Description	RPC #
FL200303101106C	Clearinghouse – Dept. of Air Force – Draft Environmental Assessment & Findings of No Significant Impact (FONSIS) – RCS# 02-1137, Amphibious Ready Group/Marine Expeditionary Unit Readiness Training – EAFB, Walton, Okloosa, Santa Rosa County (Internal note: logged in under Walton Co. as Clearinghous noted it in Walton County; Also See SAI FL200212303262/O608-01-08-2003 for previous similar submittal)	WL166-03-12-2003

X	No Comments – Generally consistent with the WFSRPP
	Comments Attached

If you have any questions, please call.

COUNTY: WALTON

DATE: 3/10/2003
COMMENTS DUE DATE: 3/18/2003
CLEARANCE DUE DATE: 3/25/2003
SAI#: FL200303101106C

MESSAGE:

STATE AGENCIES	WATER MNGMNT. DISTRICTS	OPB POLICY UNIT	RPCS & LOC GOVS
COMMUNITY AFFAIRS	NORTHWEST FLORIDA WMD	ENVIRONMENTAL POLICY UNIT	X FT. WALTON BEACH
ENVIRONMENTAL PROTECTION			OKALOOSA
FISH and WILDLIFE COMMISSION			SANTA ROSA
STATE			WALTON
TRANSPORTATION			WEST FLORIDA RPC

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To: Florida State Clearinghouse

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TALLAHASSEE, FLORIDA 32399-3000
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Federal Consistency

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- [ ] Inconsistent/Comments Attached
- [ ] Not Applicable

From:

Division/Bureau: City of Fort Walton Beach / Dept. of CDS
Reviewer: L.B. Mitchell, Planning Mgr.
Date: 3-14-03

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
9721 Executive Center Drive N.
St. Petersburg, Florida 33702
(727) 570-5317, FAX 570-5300

December 9, 2002 F/SER4/AM

Colonel Michael R. Newberry
Director, Environmental Management
Department of the Air Force
501 Deleon Street, Suite 101
Eglin Air Force Base, Florida 32578-5133

Dear Colonel Newberry:

This responds to your November 27, 2002, letter to Dr. Joseph E. Powers requesting National Marine Fisheries Service (NMFS) participation in a December 12, 2002, meeting at Eglin Air Force Base to discuss upcoming training requirements.

We appreciate the opportunity to participate. Our participant will be Mr. Mark Thompson. His contact information is as follows:

Mark Thompson
National Marine Fisheries Service
Habitat Conservation Division
3500 Delwood Beach Road
Panama City, Florida 32498
(850) 234-5061
FAX 234-2492
Mark.Thompson@noaa.gov

Please contact Mr. Thompson directly if you have any questions or wish to relay last minute details.

Sincerely,

Andreas Mager, Jr.
Assistant Regional Administrator
Habitat Conservation Division

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Southeast Regional Office
9721 Executive Center Drive North
St. Petersburg, Florida 33702

March 31, 2003

Mr. Richard W. McWhite
Chief, Natural Resources Branch
Eglin Air Force Base
AAC/EMSN
501 DeLeon Street, Suite 101
Eglin Air Force Base, Florida 32542-5133

Dear Mr. McWhite:

The National Marine Fisheries Service (NOAA Fisheries) has reviewed the draft environmental assessment (DEA) dated March 7, 2003, as prepared by the U.S. Marine Corps for the Amphibious Ready Group/Marine Expeditionary Unit Readiness Training at Eglin Air Force Base, Florida. The training activities will occur in waters of the Gulf of Mexico, Santa Rosa Sound, Choctawhatchee Bay, and East Bay in Okaloosa and Santa Rosa Counties and are anticipated to occur twice per year with each training event lasting up to ten days.

The DEA adequately identifies the estuarine areas as Essential Fish Habitat (EFH) for postlarval and juvenile brown, white and pink shrimp, postlarval, juvenile, and subadult gray snapper and red drum, and juvenile Spanish mackerel and gag grouper and the tidal wetlands and submerged aquatic vegetation (SAV) that exist within the Santa Rosa Sound and Choctawhatchee Bay to be important to living marine resources. In addition to the Federally managed species, other economically important finfish and shellfish use seagrass, wetlands, and shallow water areas such as spotted and sand seatrout, mullet, spot, croaker, pigfish, herring, white grunt, flounder, gulf menhaden, and blue crab. The wetlands and SAV also produce nutrients and detritus, important components of the aquatic food web, which contributes to the overall productivity of the estuary.

The DEA states that these training activities are not likely have an adverse impact to EFH. In this regard, NOAA Fisheries has observed at the Naval Coastal System Station in Panama City, Florida, where it appears that repetitive use of the landing crafts air cushion vessels have had an adverse impact to SAV habitat and, therefore, we have concerns with the potential to impact SAV from the various amphibious vehicles that will be employed during the training operations. It is noted in the DEA, based on historical information, that SAV does not exist within 3,000 feet of any expected operation. However, SAV may naturally wax and wane throughout the photic zone within an estuary both on a seasonal and annual basis and, to adequately determine SAV presence, the area should be surveyed prior to each training operation. If SAV is determined to exist within the scope of the operation, appropriate measures should be taken to avoid any adverse impacts and further EFH consultation, in accord with the provisions of the Magnuson-Stevens Fishery Conservation and Management Act, may be necessary.

We are aware that you are coordinating with our Protected Resources Division (PRD) to address the Federally listed threatened and endangered species that are under purview of NOAA Fisheries. These comments do not represent NOAA Fisheries in regard to our responsibility under the Endangered Species Act of 1973, as amended, and therefore, you should continue to coordinate with the PRD.

We appreciate the opportunity to provide you with our comments. Should you have questions or require additional information, please contact Mark Thompson of our Panama City Office at 850/234-5061.

Sincerely,

W. Mark Thompson

for Rickey N. Ruebsamen
Acting Assistant Regional Administrator
Habitat Conservation Division

cc:
F/SER4
GMFMC

cc: (email)
F/SER3
FWS PC
EPA, Atlanta
FDEP Pensacola
FWC Tall
GSMFC-Rester